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(ILLUSTRATED.)

DEVOTED TO THE INTERESTS OF

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AND

GENERAL SCIENCE.

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(FORTY-FOURTH YEAR.)

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[OFFICIAL NOTICE.]

Tenth Annual Meeting of the Pacific Coast Gas Association.

PACIFIC COAST GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
HAYWARD BUILDING, SAN FRANCISCO, CAL.

The Tenth Annual Meeting of the Pacific Coast Gas Association will be held in San Francisco, Cal., Tuesday, Wednesday and Thursday, July 15th, 16th and 17th, 1902. The meeting will be called to order in the Lecture Hall of the Pacific Gas Improvement Company, in their new building, No. 455 Sutter street. A reception room, reading room, and other conveniences will be provided for the use of members during the session. All books purchased during the past year by the Library Committee, and which form the nucleus of what bids fair to become a valuable library, will be placed at the disposal of the members for their use and inspection.

The following papers will be read:

President's Address, by Mr. C. E. Burrows, Walla Walla, Washington.

"Fuel Conditions in California," by Mr. John L. Howard, San Francisco, Cal.

"Gas Advertising," by Mr. R. P. Valentine, Sacramento, Cal.

"Municipal Ownership," by Mr. Frank J. Symmes, San Francisco, Cal.

"Differential Gas Rates," by Mr. M. C. Osborn, San Rafael, Cal.

"An Experiment on the Principles of Purification," by Mr. E. C. Jones, San Fransisco, Cal.

"Electrically Operated Appliances in Gas and Electric Works," by Mr. Geo. C. Holberton, Oakland, Cal.

"The Recognition of the Engineer, with Especial Reference to Gas Engineering," by Mr. L. P. Lowe, San Francisco, Cal.

A lecture will also be given by Mr. P. W. Tompkins, Analytical Chemist, of San Francisco, Cal., upon "The Methods of Determining Water and Sediment in Crude California Petroleum."

Wednesday evening, July 16th, at 7.30 o'clock, the usual annual banquet will be given, at which members only will be in attendance.

Thursday, July 17th, an outing will be arranged for the benefit of members and their families. A bay trip, to Vallejo and the United States Navy Yard at Mare Island, is contemplated, and it is hoped that satisfactory arrangements can be made whereby the privileges of the Yard will be extended to the Association. Few travelers to San Francisco are given the opportunity to visit the upper reaches of San Francisco and San Pablo bays, whose quiet waters are broken only by the picturesque Italian fishing smack, an occasional river steamer, or the characteristic homely, square-nosed, scow schooner, which, heavily freighted, lazily drifts down the tide to the markets of the world, or plunges frantically in the sea when the cool, invigorating ocean breezes blow.

Monday evening, July 14th, there will be an informal meeting at headquarters.

Contributions to the "Wrinkle Department" should be sent to Editor Geo. S. Colquhoun, Fresno, Cal., without delay.

Those who have had experiences in the past year which might prove

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of interest to members, are requested to send them to Mr. R. P. Valentine, of Sacramento, Cal., Editor of the "Experience Department."

The Question Box is a valuable feature of the meeting. It is desirable that all questions be forwarded to the Secretary as far in advance as possible in order to secure proper attention thereto.

J. B. GRIMWOOD, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

OFFICE OF EDITOR, WRINKLE DEPARTMENT,
PACIFIC COAST GAS ASSOCIATION,
1050 J STREET, FRESNO, CAL., May 14, 1902.

To the Members of the Pacific Coast Gas Association: As the Tenth Annual Meeting of the Pacific Coast Gas Association is drawing near, it behooves me, as the Editor of your Wrinkle Department, to remind you that it is time you were sending in your contributions to this department.

Wrinkles mean any small or large device, original in idea if possible, or anything that is not generally known to the gas fraternity, and that will in any way alleviate the trials and troubles of the gas man and promote his welfare and happiness, will be acceptable as a Wrinkle. If you will send in a sketch, photo or drawing, with explanation, it will be fully appreciated at our meeting this summer, as it depends entirely on the contributions, and following discussion of the members, to make these meetings successful.

Now, please, do not be backward, but send in all the Wrinkles you can gather up at once, and before you forget it. You may sign your name or not; just as you like. You surely have around your works, office, or main and service system a lot of original ideas that would be a benefit to some other member who is working under the same conditions.

Kindly make your contributions to this department at once, so as to enable me to get them in order before the meeting. Expecting an early reply, I am, Yours truly, GEORGE S. COLQUHOUN.

BRIEFLY TOLD.

MEMORIAL TO MR. TRUMBULL G. RUSSELL, PREPARED ON BEHALF OF THE WESTERN GAS ASSOCIATION.—At the last meeting of the Western Gas Association President Miller appointed three special committees to prepare suitable memorial resolutions to those members whose deaths occurred during the year. The committees were instructed to report at their convenience, and it was further determined that the memorial minutes should be published in the JOURNAL, and be subsequently incorporated in the Proceedings of the Association. Mr. John Dell, of St. Louis, Mo., was named to prepare the memorial to Mr. Trumbull G. Russell, of St. Louis, and his minute in connection therewith is as follows:

"Trumbull G. Russell, who died May 26th, 1901, was one of the original members of the Western Gas Association, which was organized in 1878, and, until recent years, was always a regular attendant at its meetings. He was a delightful gentleman of the old school, whose social and genial disposition always made him a welcome addition to any gathering. The older members of the Association will all remember him with pleasure, for there are few of them who did not know him personally, and whose enjoyment of the annual meetings of our Association was not increased by Mr. Russell's personality.

"We cannot gather together and meet year after year without missing the presence of such pleasant companions, and regretting that in all of our future meetings they will not be with us to join in our merriment and greet us with their kindly smiles.

"Mr. Russell was born in Georgetown, D. C., April 7th, 1823, and came to St. Louis in 1849, engaging in the wholesale grocery business until 1864. After that date he, with Messrs. G. W. Parker, C. S. Russell and J. G. Russell, established the firm of Parker, Russell & Company, in the manufacture of firebrick. This Company was incorporated in 1866, with Mr. Russell as Treasurer, and he held the same position with its successors, the Parker-Russell Mining & Manufacturing Company, at the time of his death. Mr. Russell enjoyed exceptionally good health up to within a few years, after which he suffered greatly with rheumatism. His illness was of short duration, and he died, whilst visiting his daughter at Springfield, Mo., in the 78th year of his age.

"The business life of Mr. Russell was an eminently honorable and successful one, and the enviable reputation and high financial position of the Company with which he was for so many years prominently connected exists to-day as a monument of his energetic, active and business-like management."

Maintenance of Incandescent Gas Burners by Gas Companies.[1]

By MR. NORTON H. HUMPHRYS, of Salisbury.

The nature and extent of the work expressed by the term "maintenance" is so generally understood that there is no occasion to enter upon a detailed explanation; and it is equally superfluous to enlarge at length upon the desirability of such work being taken in hand by gas companies. The arguments in favor of doing so have been fully set forth in one form or another; and I am not aware there is anything to be urged against it. As there is now some prospect of the removal of the serious impediments that have hitherto operated to prevent a development of incandescent gas lighting in anything like a proportion adequate to the value of the invention, an appropriate opportunity is afforded for a discussion of the subject; and I have thought that this might be introduced by a plain account of some experiences in connection with the establishment of the system at Salisbury. Its installation in the city dated from the commencement of the new public lighting contract in the autumn of 1898; and we have now 600 public lamps fitted with No. 2 or No. 4 Kern burners; 200 outside shop lights, mostly fitted with two "C" burners in each; as well as some 200 customers representing 2,000 interior burners of various kinds, including No. 0 to No. 4 Kern, "C," "York," and "Gem" Welsbachs. The whole forms a standing advertisement of the fact that gas as a lighting agent is not yet played out, but stands foremost in cheapness and efficiency, that could not be secured by any other means.

The work of maintenance is essentially one of those things that, if worth doing at all, is worth doing well; and any attempt to run it as a stop gap in connection with existing duties, and without increasing the present staff, is not likely to prove satisfactory to either party concerned. It is worse than useless to take up the thing in a muddling, half-hearted sort of way, as something to fill up the spare hours of the men who read the meters or attend to the lamps; and if the directors expect to have it brought in without increasing the present staff, it is better to let it alone. If the scale of operations permits, it should be distinct in itself, and in charge of men who devote their whole time to the work. But the maintenance staff can, in any case, be utilized for canvassing and disseminating information as to the various uses of gas. It is a good plan to provide them with printed leaflets, setting forth the terms on which gas is supplied, the facilities offered in the way of hire, hire purchase, etc., as this avoids any misunderstanding. If people are told that they can have a stove for $2.50 a year, they are apt to forget, and when the bill comes in after a few months, to think that the price named was $1.87; but I never met anyone who forgot in the other direction. A copy of the printed slip is the best answer to such lapses of memory.

The subject naturally divides itself into public lighting, outside lighting, and inside or interior lighting; and I am not in favor of partial maintenance, although I understand it has been successfully applied elsewhere. It seemed to me that to ensure the real end in view—viz., the display of efficient lighting—nothing short of entire and complete control would be successful. So these remarks are addressed exclusively to inclusive maintenance. After some experience, which goes to show that the customers cordially welcome any reasonable arrangement that will improve their lighting efficiency, and, as a rule, take as much interest in the care and maintenance of the mantles as we do, I can quite see that there is no reason why partial maintenance should not prove a success; but, in practice, there is no advantage afforded by it over inclusive maintenance sufficient to warrant the complication of affairs by introducing it. At the same time, I am prepared to take on partial maintenance or anything else that will tend to retain and to consolidate business.

The bulk of our public lighting is taken by the Town Council, but, in addition, we have five authorities outside the borough boundary, and previous to 1898 it was all carried out by means of flat-flame burners on the average meter system. The whole of the outlying districts and also about half of the town lamps were left out during four summer months. In June, 1898, there was a great demand for improved lighting, and we put in a tender for No. 2 and No. 4 Kern burners and all the year round lighting, which was accepted. This proved such an advance, both as regards efficiency and economy, on the old system, that the outlying authorities soon fell into line, and we have now no flat flame burners or winter lighting—the whole being incandescent and all the year round. In some of the outlying districts we also had a moonlight

1. A paper read before the Incorporated Gas Institute, at its 39th General Meeting, June 10-12, 1902, Southampton, England.

clause, allowing for the omission of lamps on nights which may possibly be moonlight, but often are not. This also was done away with.

Having absolutely no experience or precedent to serve as a guide, the arrangements made in 1898 were such as would possibly be modified in the light of later knowledge. We had very little practical experience in maintenance, and our lamplighters had no knowledge whatever. So, as a commencement, the maintenance of the public lamps was committed to the outdoor foreman—the lamplighters having nothing to do with it beyond reporting defects. Our town office is centrally situated; and it has been the rule for each man to report himself at the conclusion of his round—the time of his doing so being booked. A complaint sheet, with a column for each man, was arranged; and it is the duty of the foreman lamplighter to look up the defects as reported. This sheet was handed to the outdoor foreman, who was in attendance in readiness. The plan answers well and is still in use. The maintenance men are present at the hour when the lamplighters are due, and proceed at once to remedy the defects, commencing with the most important thoroughfares. The defects are classified as follows: P, pilot out; M, broken mantle; C, choked with dust; N, naphthaline (with which fortunately we rarely have trouble). The foreman had a young man with him as improver, who in a short time was qualified to take charge of the maintenance, and it is in this way that we have trained five young men to a knowledge of the Welsbach burner. After dark, and in busy thoroughfares, we send a second man to carry the ladder; and an opportunity is thus afforded of getting an insight into the practical working of the burner. While introducing the system, we made several discoveries, one of the most important of which was the fact that of the different patterns of so-called wind-proof lanterns none could be relied upon as capable of admitting the use of a naked mantle, and that a glass cylinder or bulb must be used as a protector. The Welsbach Company did not at the time supply them, and I had to get some specially made.

By the end of 1898 we had 500 lanterns fully established; and our customers soon began to notice the lights, and compare them with their own. The first evidence of this was a widespread notion that we were using a special quality of burner and mantle; and there was a demand across the counter for burners and mantles similar to those used in the street lamps. We commenced the supply of outside shop lamps on 3 years hire purchase terms, with an additional charge for maintenance, and next proceeded to take over isolated cases of indoor lighting, such as places of worship and public rooms. After about a year's experience on these lines, we felt ourselves safe to undertake any kind of work; and our efforts have been accepted with cordiality by our customers, and have given general satisfaction. We have not "rushed" the business, or used means of advertising other than an announcement printed on each bill, and a card stating terms. Many orders for maintenance are given to the men in the course of their duties, or are sent to the office as the result of seeing the men at work.

We do not undertake maintenance work for a less period than 1 year; and it is understood that our terms cover the whole of the burners on the premises. If it is suggested that one or two burners are not often used, and not worth including, we reply that it is not fair to give us the most risky and troublesome part only. This question has only arisen once or twice; and there has been very little difficulty of any kind. Our undertaking includes keeping the glasses clean and burners in good order, and the renewal of mantles, rods and plain glass cylinders when necessary, but no fancy glass or other parts of burners. If required to take over burners at present in operation, they must first be put in proper order at the customer's expense. A large part of the business is for new burners, and comes from customers who would not be likely to have the system at all if they were not relieved from the trouble of attending to it.

We have now 4 men on maintenance work, one of whom takes the public lighting. Goods required are served to them out of stores, and charged to the particular lamp or consumer for whom they are used. A separate account is kept for each lamp or customer, so that in the event of an unusually large consumption of material the cause can be traced. The half yearly totals of this book enable the cost of the whole to be arrived at, and are checked with the stock books. At first, the charge to each customer was entered in the stove rent column in the rental book; but later on a subsidiary book became necessary, showing stove rents, hire purchase, and maintenance in separate columns, the total of which is transferred to the rental book. In all cases, the charge to each customer is rendered quarterly with the gas account.

As to financial results, I am not at liberty to publish figures, but may say that, although the maintenance department is not a source of direct profit, it is not an important expense or source of loss; while the indirect advantages are such as to leave no question as to the advisability of adopting the system. Notwithstanding the reduction of consumption due to the adoption of the Welsbach light, energetic canvassing of electricity in our district, and no growth or increase of population, our sales of gas have been well maintained at an increase of 5 or 6 per cent. annually.

The Fittings Business as an Aid in the Sale of Gas.[1]

By Mr. Robert Watson, of Hertford.

It is not often that the Gas Institute has included in its proceedings the discussion of any matters concerning more immediately the sale of gas. Subjects of a purely technical character probably offer to members greater inducement for treatment and better opportunity for originality. It is difficult in everyday work, however, to run away from the fact that gas is, after all, made to be sold, and that for those in ch rge the question of demand is equal in importance to that of supply. Competition compels, and may increasingly compel, attention to the phases of the industry which relate to the consumption of gas; for though record outputs have still to be reported, these records will be more and more the result of both enteprise and hard work in distribution departments.

The means adopted by gas companies for the maintenance of progress in the sale of gas are various, and it would not be without profit if more frequent opportunities were taken to get expressions of opinions or comparison of notes from members as to the merits and demerits of the several methods employed. The paper now submitted may serve for the occasion, although its chief purpose is to suggest the more systematic development of the district fittings business, as a useful aid in increasing the output of gas. Differences of opinion may possibly occur as to how far advisable it is for a company to establish such a business, since enterprise of this character interferes in part with the trade of ironmongers. While there is something to be said in their favor, there is unquestionably a great deal more to be expressed on behalf of the gas industry.

It must be borne in mind that the *rôle* of fitters has already been assumed by gas companies, in providing and fixing cookers, etc., slot meter installations, and more recently, in the maintenance of incandescent gas burners: and the result has justified the course adopted. The great demand for gas thus caused would never have taken place had gas companies depended upon traders, other than themselves, to let out on hire, or hire purchase, what the public generally did not care, or could not afford to buy outright. The success, indeed, of the enterprise strongly suggests that gas companies might well do more both in the supply of appliances needed by their customers, and in the popularization of gas in fields as yet untouched by them as gasfitters.

It is a question, moreover, whether present day circumstances do not force the situation, and preclude the consideration of the old argument, if advanced, of unfair rivalry with the ironmongery and fitting trade. Gas is not the only lighting and heating agent, and the trade does not, nor can it be expected to, confine its attention to the exclusive sale of fittings suitable for its use. In the presence of electric lighting competition, the interests of the gas company are better served by its own fitting staff than by those to whom it is immaterial whether a gas burner or an electric glow lamp is sold and fix d. There may be no great need to fear that electric light will "spell ruin" for the gas company. Assurance as to the future is not nevertheless a reason for sitting still and watching excursions from the other camp, in the hope that countermoves on behalf of the gas industry will be made by the fitting trade. If anything is to be done, it must be done by the gas company. It is not perhaps an unmixed evil that gas suppliers must bestir themselves. Competition is ever the life of business and the incentive to progress, and the result may be to quicken both the search custom and the efforts to still further cheapen gas.

As gasfitters, the company unfortunately may, in many instances, displace the middlemen; but this individual is not a great help in retaining, still less in maintaining the progress of the company's business. An illustrative case occurs to mind. The wardens of a certain church recently talked of electric lighting, because, thanks to the ineffectual efforts of a local gasfitter, an experiment in incandescent gas lighting proved a failure. With some reluctance, the authorities permitted the gas company to take the matter in hand, when it was found that the fitter had contented himself with trying incandescent burners on internal piping which was partially blocked with rust. Things were soon remedied, and in the company's favor. This is but one of various

1. A paper read before the Incorporated Gas Institute, at its 39th General Meeting, June 10-12, 1902; Southampton, England.

cases where the elimination of the middleman has helped to retain a gas consumer.

It does seem that any enterprise which brings about direct connection between gas supplier and consumer should be encouraged for all it is worth. The value of that connection is patent to anyone who has worked a company's fitting business. Proof of it is to be found in the cooker and fire trade, which, after all, is but a phase of such business. It is certain that the universal satisfaction given by cooking stoves is due to the fact that they are supplied by those whose profit does not cease with the completion of the fixing. The continuous custom of the user of a cooker depends not merely upon the efficiency of the apparatus but of the gas supplied, and the company, in the dual capacity of gas-fitters and suppliers, are in a position to guarantee this. A better example is furnished by slot meter installations. The company who have undertaken this work may be sure of one thing—that most complaints made by slot meter customers can be attended to at the works themselves, since very few are on the score of inadequate piping, faulty burners, or inefficient stoves. The author considers that his own slot customers (numbering nearly one third of the whole) are far better lighted and served than the average ordinary gas consumer in the town. This obviously results from the close touch existing between the gas suppliers and the customers, and the company's control of everything from the main to the burner. It can safely be said that slot consumers from the flat flame burners supplied with the fittings get 50 per cent. greater light efficiency than do those consumers who pick up their burners anywhere. The burners used with Hertford slot fittings are Bray's No. 5 and No. 7 economizer caps; and photometrical tests show that these develop a candle power which is nearly equal to that of the standard Argand burner itself.

If further proof were desired of the advantage and value of gas companies' work as fitters, it would be only necessary to refer to the growing success of systems for the maintenance of incandescent gas burners. The incursion of the company into purely gasfitting realms is in this respect certainly justified; and there is ample evidence that further steps in like directions would not be unwelcome. The establishment of a good district fittings business on the part of the company is, indeed, a necessity, if efficiency and general satisfaction in the use of gas are to be insured, and further progress in its popularization made.

Putting aside the mere question of fitting employment, the company are in a far better position to help the average gas consumer. The staff, backed with the means of doing any resultant work, can the more readily offer advice to those customers in need of it, and even to those who do not particularly want it. From another point of view, the provision of a fitting depot affords the consumer a better opportunity for verbally lodging his complaint; and this is not at all a bad thing, if the company desire to give all-round satisfaction.

The fittings business is especially valued by the author for its possibilities in propaganda enterprise. While supplying the facilities for executing orders, it also furnishes a convenient spot, being in the heart of the district, from which to carry on the work of popularizing and extending the use of gas among the unconverted. Canvassing and circularizing are more easily done and controlled from the town premises, and the staff have better chances of knowing when and where to put in the seasonable word. Advertising at not too infrequent intervals undoubtedly pays for itself. In the author's district the changes are rung on the various branches of the gas company's fitting business, all of them being advertised in turn—sometimes by newspapers, sometimes by handbill, and always on the back of the quarterly demand note. The great thing is to keep the gas company and their various enterprises constantly before the public. The company should, indeed, be in evidence, as far as possible, at all times.

Some of the progress made by the Hertford Gas Light Company during the past five or six years is undoubtedly due to the adoption of the methods indicated. The increase in the sale of gas—about 50 per cent.—is neither startling nor remarkable as compared with that in some districts; but it is encouraging, in view of the relatively small gain (3 per cent.) in the population of the town during the last decade. A satisfactory feature about the company's undertaking, however, is the fact that some two-thirds of the names of the consumers are to be found on the books of the fittings business. While the cooker trade belongs rather to the usual branches of the distributing department, it may be of interest to state that during the period mentioned the ratio of cooking stoves to consumers has improved from 1 in 18 to 1 in 3.

The establishment of a fittings business may, in the case of a small company, be a matter for consideration on the score of cost; but little difficulty as regards this need be apprehended. The venture, coupled with the development of the company's distribution branches, should not involve an addition to the expenditure side of the balance sheet. At the same time, it must be confessed that no great profit can be expected in small or moderately populated districts; and this may be the case although house fitting charges are not of an undercutting character. The fittings business, as developed for the purposes of a gas company, cannot well be used as a dividend earning concern if it is to achieve all that is desired from it. Nevertheless, if it does not earn dividend, it aids in extending the use of gas, which is much the same thing. For the latter reason it is worth the extra amount of trouble and work it admittedly involves.

The actual profit on the business in Hertford—treating it apart from the usual distribution branches, and debiting it with a fair proportion of the charges for rent, rates, and taxes, insurance, salaries, light, interest on working capital, *i. e.*, barely pays for supervision. It, however, helps in the maintenance of the town office, which would still be necessary for rental and collecting purposes. All the ancillary branches of the company's undertaking—such as burner maintenance, the cooker trade, slot fitting, meter fixing, and service laying—are operated through the fittings business. They are, of course, differentiated in the process of bookkeeping. The centralization of the work tends to facilitate administration, and to minimize the relative cost of the several departments.

As far as the district is concerned, the varied character of the work and place of employment keeps the staff fairly well in touch with consumers, and it is frequently the means of procuring chances for custom and improvement which would never otherwise be heard of. In the first case, canvassing from the fitting center is sometimes successful. If improvements are possible, suggestions are made, and, occasionally, should no other course be effective, sample fittings, burners, and the like, are put in on approval.

It is always well to embody recommendations in writing. In one recent instance, where the work of improving the general lighting of a certain building was, after many complaints and as many suggestions, at length undertaken, the proprietor kindly remarked that the electric lighting competition had stirred up the company. It was with a feeling of satisfaction that reference could be made to letters written two or three years previously, pointing out the trouble and the remedy. Where competition exists, the information obtained through the fittings staff is sometimes useful for checkmating purposes. Electric lighting companies are fairly keen on the main chance, and now and again take extreme steps to displace gas, with the knowledge that some people who adopt their lighting will put up with the increased cost rather than confess to having made a mistake. It is better to endeavor to retain custom than to expect its return as a matter of course.

A good fitting business already established in the district is likely to be of further considerable use to the gas company. The present welcome move in the direction of a lower grade gas makes the direct interest of a company in fittings keener and more important. The education of the consumer as to the advantages—not to say the need—of the change is necessary; and this will be undertaken by none if not by the gas company. Occupying the position not only of gas suppliers but of fitters, the company are manifestly in a better position both to undertake this when the time comes and to do preparative work in the meantime. It is too much to hope that with the change to a more economic gas the present flat flame burners will all be discarded; and those consumers who still retain them are not likely to be satisfied with the alteration. It is well, therefore, to give them, at the district premises, the opportunity for venting their dissatisfaction. The company are at least enabled, in return, to furnish them with some practical advice, backed up with the resources of the whole fittings business.

A gas company cannot do too much both for the present and the future satisfaction of their customers in recommending the adoption of incandescent gas in preference to flat-flame lighting. Still greater success than is at present achieved may be anticipated in this direction, and with it a stronger hold on house and shop lighting. The promised cheap—and it is to be hoped not less well-made—mantles will afford a welcome stimulus to fitting enterprise in incandescent lighting. Those who have, through their fittings business, come into contract with consumers know to what extent the cost of the renewal of mantles has retarded progress in gas matters, and tended to take the edge off arguments in favor of the system. When one sees across the water for instance, at Brussels—the effect of low prices in the almost absolute predominance of incandescent gas burners, and the comparatively small show of electric glow-lamps, one regrets the chances and possibilities which have been lost at home. The sale in Hertford of both burners and mantles at something like Continental prices would, a year back, have been of greater service in competing with electric light. The sat-

isfaction shown by the general public with incandescent gas lighting since the recent conversion of Hertford public lamps to this system, and by consumers who have accepted the company's offers of maintenance, affords, however, some hope of further business, when once the cheap mantle is on the market.

Although the active recommendation of incandescent gas lighting does not conduce to an increased output of gas, the fittings business is wisely used if the pocket of the consumer is, on every occasion, studied. An economical customer is a very good friend to the gas company, not to say an excellent and cheap advertising agent.

There is one branch of fitting enterprise which, in the author's opinion, might be still further pushed. It was referred to both by Mr. Norton H. Humphrys and Mr. A. Dougall in Institute papers, some years back, but has not been undertaken by many companies. It is that of the wider application of the principle involved in slot-meter and hire purchase methods. The adoption of the slot meter system is primarily based upon the fact that the small householder is unable to find the means of fitting up his premises. The supply of cooking stoves on hire or hire purchase is due to much the same cause—the inability or non-desire of the customer to buy the apparatus himself. The removal, however, of this hindrance of immediate expense has opened the way for an extended use of gas.

There can be little reason why the company's fittings business should not be employed to meet both present and prospective customers in other directions, where cost is the consideration. There are many cases where people prefer and are sound enough, for quarterly accounts, but who yet find a bill for (say) fitting up a house too much for their current income; or, again, where tradesmen desire to make considerable alterations in their shop lighting, but are deterred by the expense. In some such instances, the so-called "free wiring" system of the electric lighting companies has its attractions, and little thought is given to the after heavy cost of the lighting bill. It is good business done if the gas company can meet these and similar cases by doing the desired work, and spreading the cost to the customer over a number of quarters on the hire purchase system. The offer to do so frequently robs the contemplated scheme of the fear of expense, and may add to the rental. The enterprise does not relatively require more capital than slot meter installations; the capital is, after all, but temporary; and the average return in gas consumption will certainly be greater. The principle is being adopted at Hertford; and it is expected that by thus giving the customer, where advisable, the option of getting his work done on terms accommodated within limits, to his circumstances, the company will gain in the sale of gas.

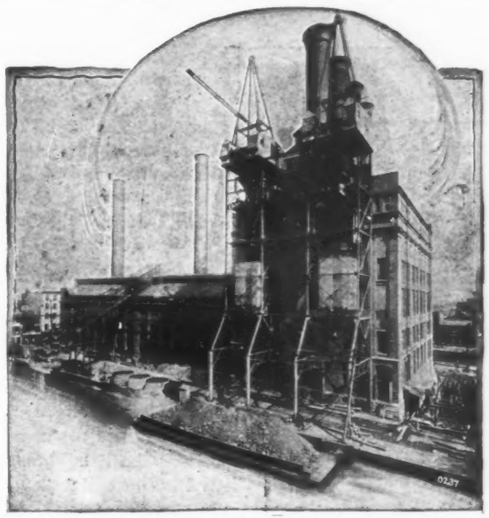
The idea of meeting the varied requirements of the consumer generally has led to the adoption of two schemes in another branch of the fittings business—that of incandescent burner maintenance. Since another paper dealing with this subject is before the Institute, its discussion is not within the province of the author. It may, however, be mentioned that the schemes provide, at the option of the consumer, either for inclusive maintenance at 18 cents, or for partial maintenance at 8 cents per burner per quarter—the material in the latter case being paid for separately. In both schemes a reduction is made for a number of burners.

Speaking generally of a district fittings business, it is obviously out of the question to reckon up its advantages in millions of cubic feet of gas sold; but it is impossible to work the business without being conscious that it has a definite value to the gas company concerned. The greater facility with which the usual distribution branches can, through its agency, be administered, and the additional means it affords of establishing a closer connection between supplier and consumer, are in themselves sufficient inducements to recommend the undertaking for any company.

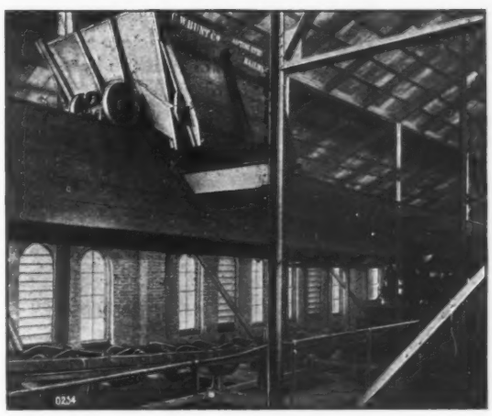
The Highest Power Station Coal-Hoisting Towers.

After the various railway and electric companies of Baltimore, Md., were consolidated under one management, the United Railways and Light Company owned 13 power houses. It was impossible to get economic results from these isolated plants, so that a central station was designed from which current is to be distributed for street railway purposes throughout the busy city of Baltimore. The site of the new station adjoins the old plant on Dugan's Wharf, erected by the City and Suburban Railway Company in 1895. A fireproof building, 94 feet by 131 feet, houses a boiler equipment, ultimately to be of 16,000-horse power capacity.

In the new boiler house now building, thirty-two 500-horse power Babcock & Wilcox water tube boilers are to be located on 2 floors, and



Pratt Street Station and Coal-Hoisting Towers.



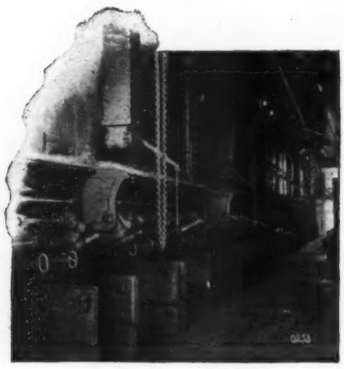
Hunt Conveyor and Motor.

in 4 sections. Four stacks, 200 feet in height and 13 feet inside diameter, divide the entire building in two parts with batteries on either side. Above the boilers are two coal storage bins with a capacity of 6,000 tons. Each bin is 32 feet wide, 34 feet deep and 128 feet long.

The arrangement of the plant necessitates raising the coal to a great height, which, together with a large fuel consumption, made the conditions most exacting. The coal-hoisting towers and machinery were designed and constructed by the C. W. Hunt Company, New York, while the arrangement of the electrical apparatus in the tower is due to P. O. Keilholtz, Consulting Engineer of the United Railways and Light Company.

On the east side of the boiler house, two steel towers were built for hoisting coal, one of which has been equipped throughout while work on a duplicate equipment is in progress. This plant has the double distinction of having the highest hoist of any power station, and being the only one of its kind equipped throughout with electrically operated hoisting and conveying machinery. Each of the coal-hoisting towers is 183 feet high, and the horizontal booms, 52 feet in length, extend over the water. The 1-ton shovel is lowered by means of a cable passing over a truck which runs back and forth on the booms to the shovel below. The shovel hoist and boom truck are driven by electric motors geared to the hoisting drums.

When the shovel descends to the coal in the barge, the hoisting motor is started and closes the shovel, fills it with coal, hoists it loaded 151 feet over the tower and dumps the coal into a hopper at the front of the tower on the engine platform. The shovel is then lowered open to the coal, and is ready for another trip. An engineer and assistant regulate the operations of the hoisting machinery from the second platform in the tower, the former controlling the hoisting drum motor and regulating the speed and direction of rotation; the latter controls the motor hoist actuating the trolley on the boom. The shovel does not twist in hoisting or lowering, notwithstanding the great height of the hoist. The coal passes from the hopper through a Hunt coal cracker, where the large lumps are broken to the proper size for automatic stokers. By



Boiler Fronts and Coal Chutes.

means of a double-jawed cut-off valve the coal is fed into a Hunt automatic railway car, then weighed. After the car is pushed off the scales, it passes to an inclined track over the bins, and is automatically discharged by a stop previously located at the point where the coal is needed. The inertia of the loaded car on the incline is stored in a counter weight which, when the load is dumped, returns the car to the scale for another load. The tower was equipped by the C. W. Hunt Company, and has a capacity of 50 tons of coal per hour. Recent records show that the hoist will deliver considerable more coal than the capacity given above. While the consumption of coal in a station of this size would probably be 100,000 tons per year, the coal handling plant has a capacity of 10 times that quantity of fuel taken from the boat and delivered to the storage bins.

Under each of the boilers is an ash hopper with a cut-off valve; the Hunt noiseless gravity bucket conveyor receives the ashes which descend into, and are removed from the hoppers by gravity. The ashes are carried over the coal pockets and dumped into a chute leading into ash bins in the tower, from thence they are removed by car or boat. This conveyor is 430 feet long with a vertical lift of 86 feet, and is motor driven. When carrying a load of ashes it requires but 5-horse power to keep it moving, which is a demonstration of its mechanical efficiency.

No shoveling or manual labor of any kind is required in receiving, transporting or emitting coal or ashes from this plant, and the machinery is as nearly automatic in its operation as possible. The Pratt street station is a good example of what can be accomplished with approved coal handling apparatus, and illustrates how the fuel and ashes of a metropolitan power house are handled with maximum convenience and economy.

Foundry Costs.

[A paper read by Mr. R. C. Cumningham, Holyoke, Mass., at the last meeting of the American Foundrymen's Association]

At the last annual meeting of this Association I presented a paper on "Foundry Costs." The ground I took at that time was that we were doing a large amount of work in our foundries which only increased our costs and did not increase our production, this unnecessary work being due to badly made and worn out patterns. The article was severely criticised by pattern makers and others in trade journals and by personal letters. One man went so far as to say that the principal reason that foundrymen were not consulted more in the construction of patterns was that very few could tell by looking at a drawing how a pattern should be made, and during his 25 years' experience as a pattern maker he had only met one foundryman who could read drawings intelligently. It was claimed that the paper had a tendency to create a bad feeling between foundrymen and pattern makers, and there would be constant wrangling as to how patterns should be made. I certainly had no intention of saying anything to belittle the pattern maker or to provoke discord in any shop. I made the statement at the time only in the interest of the foundrymen, and I feel to-day that I am backed by a large majority in what I said.

Shortly after the convention I had occasion to visit a prominent concern. In conversation with the manager he told me that he thought my paper would do good, and wanted me to go through his works and tell him just where he could save money. He further added, "I think we are about up to date, but am willing to learn." I went into his foundry, and in observing things my attention was attracted by a molder standing apparently waiting for something. While I was watching him the workman next to him passed him over his rammer. He took it and went to work. Upon investigating I found that these two molders had only one rammer, one shovel and one No. 4 riddle. Neither had a fine riddle, brush, pail or bellows, nor, in fact, any of the tools that are usually furnished by the company. They had quite a numbers of helpers in the shop. They did not give each of them a shovel. I spent the greater part of a day about the shop carefully observing the way the place was managed, and I think I am safe in saying that 10 per cent. of the men did not have proper tools to work with and depended on borrowing from the other men or upon what they pick up about the shop. As I was leaving, the manager called me into the office and inquired if I saw anything I would have different. I told him I thought there were some things that could be improved upon. He wanted to know what they were. I told him of the things I saw in the shop. He thanked me, and said: "I will look into it and I will write you." This happened about ten months ago. I had forgotten about it when a few weeks ago the following came to me:

"You will remember spending a day at our works several months ago and of expressing yourself about how you found things in the foundry. The next day after you were here I went into the foundry to find out the truth of your statement, and I will have to admit you did not half tell it. I went into the foundry and stayed there over a week, and I will say candidly I do not see how the men could do as much work as they did. In a few days every man had his supply of tools, marked with his number. I stopped the molders waiting around in the morning. I had all their patterns and flasks on their floors by 7 o'clock. I have the flasks fitted before the job comes into the foundry. The molders work no harder than they did before, but we are turning out more castings and they are much better. Our expenses remain about the same, lower if anything, which shows a reduction in the costs. The statements you made in your paper before the American Foundrymen's Association last year were facts. Our foundries are neglected. We should pay the same attention to them that we do to our machine shops. I sincerely hope you will give us another paper on the same subject this year."

This letter comes from a man who thought his foundry was up to date, and I have no doubt that there are many more of the same mind. Now I wish that every foundryman present at this convention, when he returns to his own home, would go into the foundry and do as this man did, stay there a week or a month if necessary (it is a good healthy place to stay) and just take notice of the patterns that come into the shop and see if the molders have the proper rigging.

See that there is no waiting for anything. Give your molders a chance and you will be surprised at the results. Now I wish every foundryman present to-day would try this, and at the end of three months write me the results; no matter what they are I should like to know how you found things in your shops. Those of you who are about your shops daily have no doubt seen and corrected everything of this kind found there, but those of you who walk through your foundry only occasionally are the ones that I want to take this to heart and bear in mind that the little annoyances are where the time is lost. They may seem small in detail, but are large enough in the aggregate to increase the cost of your castings. The time when we can get more than a fair day's work from a man has gone by, and to-day every foundryman must keep close watch on his costs and production or he will find the balance on the wrong side of his ledger. In my opinion his only hope is to devise ways to do his work with more unskilled labor. By doing this he will not be dictated to, but will have a chance to get more benefit of his brain work than is now accorded to the employer of skilled labor.

There is one fact that we must not close our eyes to, and that is that the tendency of organized labor is to keep the production down to the lowest possible point, and at the same time increase the minimum rate of wages. Now with these cold facts staring us in the face we must watch very carefully and see that no work is done that we get no returns for. An hour or two spent on a badly made or worn out pattern means an increase in our cost, and does not increase our production, and in order to overcome this we must figure and scheme to have things so that the molder can turn out more work. An increase in our production without an increase in our cost is what we must aim for. To do this we must study every pattern, and if we can, by making changes, make a mold any quicker, we should not delay a single day in doing so.

I want to give you one illustration on this point: We have at our works a pattern for a 16-inch steam piston ring. During the past 25 years the company has made thousands of these rings. They were molded in the usual way. The pattern was made about 1 inch wider than the casting wanted, to be able to secure it on the face plate while turning. The ring is then cut off the desired width, and cut into four segments. The actual cost of labor on one set of these castings when they were ready to put into the cylinder was 75 cents. The casting in the rough weighed 23 pounds. The finished casting weighed 7½ pounds. The waste piece cut from the ring, that went into the scrap, weighed 6 pounds. Nine pounds went into turnings. I expended $3.75 on a new pattern and plates, and am now putting these same castings into the erecting room for 4 cents a set. Besides the saving on the iron, I am

saving 71 cents on labor on each set of castings. The company make probably 500 sets of these rings a year, including the new work and repairs. The saving on this job alone amounts to three hundred and fifty odd dollars. A half dozen jobs like this would pay the salary for a good man for one year.

I do not claim that every job can be put on a machine on plates and the same results obtained, but even if we can get an increase in our production of 25 per cent. without any increase in our expenses, it is certainly worth trying for. Our company have put on plates during the past year over 200 different patterns, and on none of them have we made anything less than 50 per cent. saving. Any foundryman is welcome to come and inspect our patterns. We have no secrets about our shop. What we have learned by experience we are willing you should profit by if you wish.

An amusing incident happened at our works a short time ago. A foundryman was visiting our shop and I was showing him this same pattern which I have mentioned here. After looking it over carefully, he said: "It is a very fine idea, but I fail to see where you get any credit for it. According to your own statement you have cut down your production about two-thirds. Now, unless your firm do differently from any other you only get credit for what castings you turn out; where you formerly got credit for 23 pounds of castings, now you only get credit for 7⅓ pounds. It looks to me as if you were helping the machine shop at the expense of the foundry." I told him I was working for a firm that gave credit where it was due, and I think that every company should let their men understand that any improvements gotten up to reduce the costs or increase the production would be liberally paid for. It should be the aim of every foreman to encourage this among his men, particularly among the younger class. There is nothing that encourages a young man as much as it does to ask his opinion. We must remember that from among the young men we are to find our future foundry managers, and when they take the burden from our shoulders let us have the satisfaction of feeling that we exercised our ability to its fullest extent in filling up those dangerous pitfalls and removing as far as possible the stumbling blocks from their paths.

Multiple Arc Lighting System.

According to the *Electrical World* the Fort Wayne Electric Works has developed a street lighting system, the leading feature of which is the readiness whereby existing incandescent lighting systems by its use may be adapted to include an arc lighting system with a minimum expenditure for line material and equipment. The general plan of this multiple system of inclosed alternating arc street lighting is illustrated in Fig. 1. This diagram shows a complete installation, and illustrates

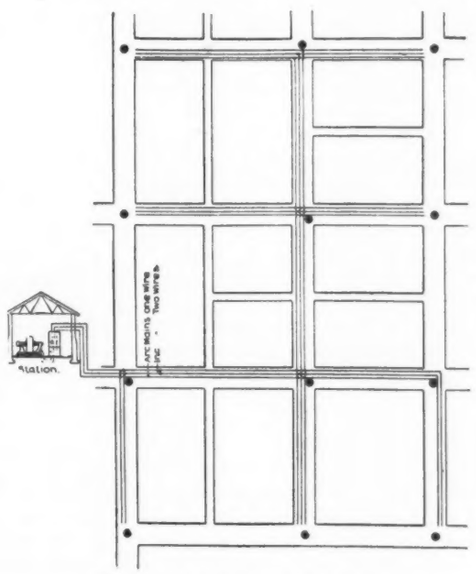


Fig. 1.—Multiple Arc Lighting System.

the method of distribution by a 3-wire system from which incandescent lights and arc lights may be operated from the same high potential mains. The particular application here illustrated is that of 2,000-volt alternating-current incandescent distribution system, having step-down transformers from which the secondary mains are supplied with current at standard incandescent lamp voltages.

Fig. 2 illustrates the only change in the equipment of the power sta-

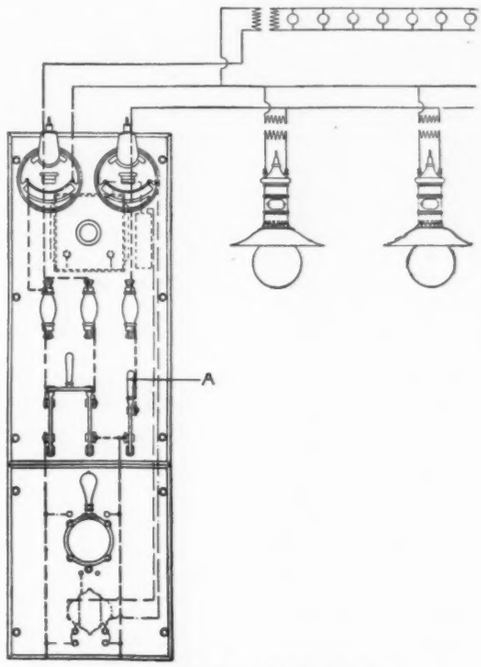


Fig. 2.—Multiple Arc Lighting System.

tion rendered necessary by the addition of such an arc lighting distribution system. By referring to same, it will be noticed that it has been necessary only to install one wire in addition to the incandescent mains, and a single pole, single throw switch *A*, connecting this third wire with one side of the incandescent lighting circuit. The arc lamps are operated on small individual constant-current transformers—one transformer for each lamp—connected to the third wire and the opposite side of the incandescent circuit. By this means it is possible to use one side of the existing incandescent lighting circuit as a common wire for the arc lighting and incandescent lighting circuits. This plan can be followed in a great majority of cases. There are, however, a few instances where incandescent mains and arc circuits are widely separated, and it is here found necessary to extend one side of the incandescent mains to accommodate the arc lighting circuit.

In general, this system can be installed in any locality requiring street lighting, but the particular case where its application can be made most advantageously, is in small towns or suburban districts already supplied with an incandescent lighting system. In such cases the demand for light is not usually such as to warrant an outlay of capital sufficient to provide a separate set of arc light mains and the accompanying switchboard and other station equipments. The usefulness and adaptability of the system are not limited to the cases just mentioned, but they may be extended to the full capacity of the station. In this way a much larger generating unit may be installed than is needed for incandescent lighting, thus obtaining the advantage of high efficiency generator, as well as saving in the original cost of installation.

The "Wood" transformer, used with this system, is designed to operate on 1,000 or 2,000-volt primary alternating current circuits, and develops practically constant energy in the secondary with wide variations of resistance in the secondary circuit. A short circuit of the secondary of one of these transformers affects only the one lamp to which it is connected and will not interfere with the operation of any other part of the system. The transformer can be adjusted for various secondary voltages and frequencies. Considerable variation in the primary voltage does not materially affect the value of the secondary current. The primary and secondary coils are wound entirely separate and never come in contact with each other when the various adjustments are made, thus reducing to a minimum the chances of cross conections between the coils. The "Wood" primary fuse box used with this system may be either double or single pole, according to the condition of installation.

The "Wood" arc lamp used in connection with this system is a new enclosed form, recently developed by the Fort Wayne Electric Works, and the general appearance resembles the inclosed series arc lamp, re-

cently introduced. The interior construction and mechanism are practically the same as in the other lamps of this design, and include many of the valuable features of simplicity, interchangeability, cool operation and substantial construction. The lamp operates at 6.5 amperes with 75 volts at the arc and consumes 418 watts.

It is claimed that the efficiency of this system is very high and does not vary with the number of lamps in service, but remains constant for all loads—an advantage possessed by the multiple system which is lacking in other systems in which the efficiency diminishes rapidly as the load decreases. The same may be said of the power factor, which is high, and the same with any number of lamps in operation; the system thus does not consume unnecessary generator capacity when operating at light loads. In a constant current system the apparent energy is the same for all loads, which means the same consumption of generator capacity whatever the number of lamps in operation, while in the multiple system it varies in direct proportion to the number of lamps in operation.

The great flexibility of this system is one of its leading features, since it permits the operation of arc lamps of various candle-power on the same circuit simply by the use of properly adjusted transformers. In a series system this cannot be done, as the line current is maintained at a constant value. In many instances it may be desirable to locate single arc lamps where arc circuits are not installed, particularly where municipalities require additional arc lamps at distant points or suburban districts. In such cases it is only necessary to obtain a single unit, consisting of arc lamp, transformer, and fuse boxes, connecting with the primary distribution mains in the same manner as extensions of the incandescent system are made. In this way the system obtains all the advantages of an incandescent lighting system and at the same time retains the valuable features of a multiple arc lighting system. Some of the more important points claimed for this system are its high efficiency and its extreme simplicity and flexibility.

Automatically Lighting and Extinguishing Public Lamps.[1]

By Mr. W. R. Mealing.

The subject of dealing with the lighting and extinguishing of public lamps by a reliable automatic system has considerable interest for gas engineers, and the need for such a system has been fully shown in the discussions which have been contributed to such gatherings as the Gas Section of the Glasgow Congress last year. The need has been long felt; for the difficulties experienced with lamplighters, whose service in many places is very unsatisfactory, have been and still remain a cause of tribulation to many gas engineers. But the question has perhaps come more immediately to the front of late because of the competition of electricity in public lighting, and the consequent desire of the gas industry to utilize improvements, not only in gas production but also in distribution, which effect substantial economies and help to render gas lighting unassailable in the matter of cost. And, further, attention has been drawn to the subject by the published results of the efforts made by inventors to supply an effective automatic lighting system, and by the trials made by prominent gas engineers of various apparatus submitted to them.

Circuit and Independent Systems.—The lines upon which different men have worked in the endeavor to achieve an efficient system may be roughly classed as having two distinct aims. On the one hand, the aim has been to perfect a circuit system which should control a large number of lights from a central position, and, on the other, to devise a reliable apparatus which should work each lamp separately and independently. So far as results at present show, it would seem that no system devised to control the lighting up and extinguishing of a section of lights from a central point is likely to be free from the disadvantages of great cost of installation and great difficulty of repair should breakdown occur. With a circuit system, whether worked electrically or by other method, a breakdown will affect many, if not all, of the lamps in the section; and to locate the cause of failure and remedy it will cost much time and labor. But in a system which works each light, or cluster of lights, separately, this disadvantage does not exist, since a breakdown, if it does occur, affects only one lamp, and the failure is easily observed and quickly remedied. A further advantage of the separate system is to be found in the fact that the apparatus, where required, can be made to actuate a midnight arrangement in a cluster of burners—an operation which the circuit system cannot satisfactorily accomplish.

1. A paper read before the Incorporated Gas Institute, at its 89th General Meeting, June 10-12, 1902, Southampton, England.

It remains, therefore, that an apparatus to work each individual lamp appears to be the practical method of dealing with the problem; and this, I believe, is the view of the leading gas engineers who have interested themselves in the subject. There are several essential requirements which such an apparatus must fulfil. It must be a real economizer, working automatically for such a length of time that the saving in labor will be substantial. It must be simple in adjustment, so that the alterations of time for actuating the lights may be easily and quickly carried out by an ordinarily intelligent workman. It must work accurately, so that the turning on and off of the lights at the times required may be fully relied upon. It must be compact, so that if placed in the lantern it may occupy little space and throw no shadow; and it must be durable, to withstand changes of temperature and wear and tear without developing irregularities. Finally, it should be adapted to fixing to burners and supply pipes at present in use, and with a minimum of trouble.

The Gunning System Described.—The object of this paper is to give a short description of an appliance upon which Mr. John Gunning, of Bournemouth, has been working for the past five years, with a view to perfecting an apparatus which will fulfil these conditions. The principle of the apparatus is a simple one. The inventor devised a rotary tap, pierced with gas-ways, to feed one or more burners and a by-pass. The tap is contained in a junction-piece, 2½ inches in length, which is made to screw to the top of the supply pipe, and also to receive the burner on the top of the connection formed by it. The tap is fitted with a star-wheel, which is so placed that each cog becomes engaged by a slowly revolving pawl; and the movement of the tap, effected by this means, opens the gas-way to the full extent. The movement of the next cog, by a second pawl, closes the main gas-way and opens the by-pass.

For the motive power for the pawls a clockwork mechanism was chosen, and it was ultimately found that a strong and reliable clock of the best workmanship best met the requirements. A very powerful spring acting by means of the pawl direct upon the rotary tap direct upon the escapement, is inclosed in a small brass case, which is fixed at the bottom of a larger case containing the remainder of the clockwork; the whole forming a strong and practically dust proof cylindrical brass case 3½ inches in diameter. The spindle of the clock is carried through from the spring to the front of the case, and has fixed to it a flange about half an inch in front of the case face. In front of this fixed flange, and working round the spindle, is a movable disk which is perforated with 24 holes, each hole representing one hour; and in front of the disk, also working around the spindle, are the pawls, which are also movable and each of which is pierced with a hole, through which a screw runs. With this screw each pawl can be fixed into any one of the 24 perforations in the disk, and both pawls and disk screwed firmly on to the flange. When securely screwed, and the clockwork wound up, the disk makes one revolution in 24 hours, and works in this manner for one week.

This clockwork mechanism is fastened to the brass junction piece in which the gas tap turns, and is so placed that each pawl of the clock in revolving engages one of the cogs of the gas tap. The movement of one of the cogs by the pawl turns the light full on, and leaves the next cog in position to be engaged by the next pawl of the clock in rotation—this second movement of the gas tap extinguishing the light. Thus two pawls attached to the clockwork disk revolving once in 24 hours will actuate the tap twice in that time—the movement of the first cog turning the light on and the second extinguishing it—at the hours at which each of the two pawls is fixed.

The gas-way for the by-pass is arranged for the pilot light to be extinguished when the lamps are alight, and the by-pass pipe is regulated at the top, so that the pressure of gas is carried right up to the flame, with a view to minimizing the danger of extinction in rough weather. For working a midnight arrangement in a cluster, the tap has an additional gas-way supplying that burner which is to remain alight until daylight, and three pawls instead of two are used on the clockwork apparatus. The first pawl turns on all the lights, the second turns off the midnight lights, and the third turns off the daylight burner. With clusters of incandescent burners, the by-pass pipe is branched, so that a pilot jet is alight at each burner when the flame is lowered.

The Method of Setting.—The clockwork used runs for one week when wound. Although this apparatus could easily be made to work for a fortnight, or even longer, without rewinding, the weekly mechanism was adopted, since it is considered that each lamp should be visited once weekly for lantern cleaning, resetting times of lighting up, etc. The method of setting is very simple. Having loosened the screws which fix the pawls and the disk, the operator places the disk in such a position that the hour at which he is winding the apparatus is in exact

line with a straight mark made on the supply tap for the purpose. He then fixes the pawls, respectively, to turn the light on and off at the required hours to follow. Thus, if the hour at which the attendant winds the apparatus is 11 A.M., and the light is required to be turned on at 7 P.M. and extinguished at 5 o'clock next morning, the attendant places the number 11 exactly opposite the mark on the supply tap and screws the "on" pawl into No. 7 hole following it and the "off" pawl into No. 5 hole following that. The apparatus actuates the light at these hours until reset. It will be noted that hours only are marked upon the disk; but if, at the time of setting, the disk is placed fast or slow in relation to the actual time, quarter-hour differences in lighting up can be secured.

The essential necessity in such an apparatus is that the clockwork mechanism shall be accurate and reliable, and that the pilot flame shall not fail. After prolonged investigation, Mr. Gunning adopted the mechanism above outlined, and it has successfully met severe tests in towns where the apparatus has been installed in the public lamps. Engineers in different parts of the country have been supplied with it, and the inventor has received reports as to the accurate working of the system. It may be mentioned that in a town so near as Bournemouth a considerable number of the appliances have been in use for some three years, and have given every satisfaction; but it should be added that the first installation adopted there was designed to extinguish the lights only, and that the use in that town of the appliance as now shown—*i. e.*, to turn on as well as to extinguish the lamps—is more recent.

Efficiency and Economy.—It is hardly necessary to mention to a meeting of gas engineers the savings that can be effected by a system of this kind, if the requirements of reliability and durability are fulfilled. As to labor, an attendant working a full day of eight hours will, it is computed, be able to wind and set from 800 to 1,000 lamps per week; and the apparatus, by turning on and turning off the lights at the times actually required, should also effect savings in gas consumption.

The apparatus has been successfully used with high-pressure self-intensifying lamps, and a series of tests with incandescent burners has shown some interesting results, as the turning on of the gas is so gentle that the danger of lighting back seems to be entirely removed. The use of the apparatus is also likely to prolong the life of mantles very considerably, since injurious explosion and the jerking of mantles at the time of lighting are done away with. As to the by-pass, it is, of course, necessary for a reliable pilot light to be used with an apparatus of this kind, and the steps taken by the inventor to insure against the failure of this light have been shown. But the supplying of the by-pass pipe as part of the appliance necessitates that the pipe should be of correct length for each of the many different burners, with anti-vibrators and other attachments, used in public lighting. The cost of the gas consumed by the pilot light must also be taken into account, although this expense is dwarfed by the large economies that can be effected by an efficient and reliable automatic lighting system.

Discussion.

Alderman Miles asked how long the apparatus had been in use at Bournemouth. The term used by the author was "somewhat recently." They would be glad to hear how long the system had been in use there, and with what success, and whether it would be possible to obtain this apparatus for trial at one's own place previously to adopting it on a large scale, and also something about the cost.

Mr. Shoubridge said he thought they were all agreed as to the value of an apparatus of this kind, if it was thoroughly reliable, and if the inventor had succeeded in producing a mechanism which would stand changes of temperature he deserved the thanks of the Institute. He had himself had an arrangement somewhat similar to this in use for the last 6 months, and although it had been under the personal care of the London agent of the firm who supplied it, he was sorry to say that there was such a large number of failures as to quite exclude the possibility of his company adopting the system. He would therefore be very glad if the author would tell them how long this apparatus had been in use in any place, and what had been the percentage of failures with it. They all knew that clocks were liable to get out of order. He had several in his own house, and no two of them were alike; and that was one of the difficulties with an apparatus like this.

Mr. Jones, Pontypridd, said he felt that any gentleman who improved the conditions of lamp lighting deserved the thanks of the Institute, for lamp lighting, as they knew, was one of the great scares of the gas manager. He was, however, afraid of this mechanism. He had tried several of the apparatus himself and had failed to get such satisfaction as he had anticipated. He should certainly be glad to welcome anything in the direction of an automatic lighter. Looking at the apparatus as it was shown he was afraid it would be a great temptation to many of the inhabitants of his district to remove them for use as ornaments in their houses. He would like to know the cost of the apparatus and what would be likely to be the saving, and whether they would require much supervision with regard to cleaning and all that sort of thing. If it would only save the leakage, which was often very considerable, it would be generally admitted, he thought, that it was a good thing.

Mr. W. W. Hutchinson asked the author of the paper what were the chief objections to the circuit system. Mr. Mealing said the circuit system broke down, but it seemed to him that the system had been rather cavalierly dismissed.

Mr. R. Fish, East Cowes, said he was very pleased to see this arrangement for lighting public lamps. He had had one under a very severe test, and he was so pleased with the results that he had requested the maker to fit up 40 lamps, apart from those which he already had in his district. He thought there was a great future for these controllers, because every gas manufacturer who had charge either of large works or small had from time to time difficulty with lamplighters, and in having the lamps lighted and extinguished at the proper time. He remembered that when he first joined the Institute, in 1870, a very able paper on the lighting and extinguishing of public lamps was read. The apparatus then described was called the "iron lamplighter," but simple as it was there were found to be many defects in its working. He had not found any defects in this simple arrangement, but it was sometimes the simple things which took the longest time to learn, and some people never learnt them at all. He had very great faith in these little mechanical appliances, and he hoped they would prove a success and make things a little more easy for gas managers throughout the country.

Alderman Miles suggested that the inventor should be prepared, if possible, to put five or six on approval in any representative town where they could be thoroughly well tried.

Mr. Mealing thanked the meeting for their cordial reception of his paper, and in reply to the inquiries of Alderman Miles and other gentlemen he would be very pleased indeed to supply any number of this apparatus, according to the importance and size of the town, for free trial, for a period of about 2 months. That would give an opportunity for the apparatus to be thoroughly tested, and it could either be continued in use, or returned if not effecting what was anticipated of it. The actual cost of the apparatus itself was $7.50, and for the midnight arrangement $8.75 each; but the success which had attended it in many cases had induced the inventor to arrange the supply of the apparatus at an annual rent of $1.25, so that a saving could be effected without a large outlay of capital. As to the percentages of failures, he was, unfortunately, not in a position to give Mr. Shoubridge the figures he asked for. It had only been within the last few months that a considerable number of the apparatus, running up to some hundreds, had been supplied to different engineers throughout the country, who were now testing them. They would, of course, expect to hear from time to time that failures were occurring, and he would be very pleased indeed to send Mr. Shoubridge the figures that they might have to date. But he did not think that the failures had been very numerous. A clockwork arrangement, of necessity, was not always to be relied upon, unless it was made by the very best processes of manufacture. The apparatus has been in use for many years now, and the reliability of the clockwork arrangement had been their principal difficulty in perfecting it. He did not say that this was a perfect apparatus yet, but they did know, from the results that they had obtained during the past few months, that it was of great utility, and the percentage of failures in one or two places he could name was practically nil. He did not think Mr. Humphrys was present, but that gentleman should be able to speak of the results he had obtained with a dozen of the apparatus in the last six months at Salisbury. Mr. Humphrys had told him that results were in every way satisfactory; there were no failures, and he had now decided to have them fitted to the high pressure self-intensifying burners there. At Bournemouth the new apparatus had only been used for a few months. The apparatus for extinguishing the lights was used there for some three years, and the Corporation were also now adopting it for use with the high pressure and self-intensifying burners, such as the Welsbach and burners of that type. He was afraid he could not directly answer Mr. Hutchinson's question, as he had no figures as to the failure of the circuit system, but he could procure figures with regard to it, and would be pleased to supply them to him.

MR. PETER ENGLISH, who removed from Benton Harbor, Mich., to engage in the construction of a gas plant at Boulder, Col., has further involved himself by taking unto himself a wife.

Calcium Carbide from Non-Electric Furnaces.

Engineering says that recent experiments on the heat of formation of calcium carbide once more direct our attention to the use of mixtures of air and oxygen in metallurgical furnaces. The unsatisfactory condition of the carbide industry has various causes, as electric furnaces are undoubtedly wasteful, and many attempts have been made to prepare the carbide in ordinary furnaces. The experiments with peat are not likely to prove successful. But Rothmund has shown that carbide can be formed at so low a temperature as 1,620° C., and he further demonstrated that at 1,560° finely powdered calcium carbide is split up again into lime and carbon by carbon monoxide gas. This re-decomposition of calcium carbide has often been suggested, as is, indeed, not surprising, when we consider that the oxides of the alkali metals are reduced by carbon at white heat, whilst at red-glow a piece of sodium metal will decompose carbon monoxide gas into oxygen and sooty carbon. Rothmund's furnace consisted simply of a hollow arc-light carbon, charged with powdered lime and carbon, and heated electrically. Boochers estimates that in crucibles not heated by the electric current the formation of calcium carbide requires a temperature of at least 2,000° C. He charged a graphite crucible with layers of lime and charcoal, using an excess of the latter, as the crucible was not heated from outside, but all the heat was produced within the mass by combustion with air to which more or less oxygen was added. The air mixture was preheated by passing it through a coil wound round the upper part of the crucible. If we assume that carbon monoxide would be produced from this combustion, the following temperatures should result after Le Chatelier and Mallard: Burning air, 1,260° C.; air containing 35 per cent. of oxygen, 1,800°; air with 50 per cent. of oxygen, 2,200°; pure oxygen, 3,100°. If some carbon dioxide is formed, the temperatures will be higher. No carbide was formed when air or the 35 per cent. mixture were applied; with mixtures of 50 or 60 per cent. of oxygen, fair yields of crystallized calcium carbide were obtained. That carbide can be easily produced when we feed an ordinary furnace with oxygen, is confirmed by Danneel; no preheating of the oxygen is required. Common illuminating gas, on the other hand, will not answer, because its flame is too diluted. This may sound strange, but the following experiment, described by Weögenburg, explains the point. The gas is heated by electric resistances in a closed chamber, provided with a burner at the top, and mixed with a sufficient amount of oxygen to give a non-luminous flame. It will be found that only the carbon is burned to monoxide and partly to dioxide, while the hydrogen escapes uncombined; the hydrogen, therefore, only dilutes the gas. But we return to the formation of carbide in furnaces burning air, artificially enriched with oxygen. Such air can be made in various ways, and is much less expensive than anything approaching a high percentage oxygen. Linde machines, it is stated, yield 1 cubic meter of a 50 per cent. oxygen, or 8 cubic meters of a 35 per cent. oxygen, per horse power hour. If we feed metallurgical furnaces with such oxygen, we could attain much higher temperatures than we produce at present with the aid of powerful blowing engines. We are quite aware that rich oxygen is not likely to become cheap, and that laboratory reactions of pure oxygen have not much importance for the practical metallurgist. But we might try oxygenized air.

Applications for Space at the Universal Exposition, St. Louis, 1904.

The Department of Manufactures of the Universal Exposition of 1904 is now issuing (upon request) blank applications for space. These applications are designed to provide the Exposition officials with information as to what establishments intend to exhibit, what the requirements of exhibitors are in regard to electricity, steam, gas, water, compressed air, sewerage, etc., and how much space is desired.

The form to be filled out designates the following: Date of application, name and address of exhibitor, general nature of exhibit; dimensions of space desired, in length and width and total square feet; kind of space (wall or floor); description of exhibit, with scale drawn. The following questions are also asked in the form:

Is electricity, steam, gas, water, or drainage required? (Quantity and purpose must be specified.)

Is intended exhibitor a manufacturer or a producer?

Are special foundations required? If so, full particulars.

Will intended exhibitor manufacture on space?

Is a concession to sell articles or products desired?

These applications, properly filled out and forwarded to the Exposition authorities in St. Louis, will secure to all requests for space consideration in the order of their merit.

Those intending exhibitors, therefore, who respond promptly by filling out and returning applications sent them, can hardly fail to receive all that they need for a successful exhibit and will, in addition, thereby save considerable expense in their installations, as an increase in the time at command always means a decrease in cost of preparation. In the same way, the efficiency of exhibits may also be materially increased as the best results in design and detail can only be obtained by the use of much thought and time. Many things, indeed, pertinent to a proper display of the processes, machinery or products of an exhibitor, depend upon the promptness with which application for space is made.

The filing of such applications implies no obligation; no pecuniary consideration enters into contracts for space. There is no charge for exhibition space. In fact, where practicable, every expense has been eliminated in order that the exhibitor may apply all of his appropriation in making an attractive and effective installation. Even power and light will be furnished free when in the judgment of the Exposition authorities it is warranted. It is not strange, therefore, that there is such a uniform desire on the part of the manufacturers to exhibit, as is reported, for the above is sufficient indication of the broad gauged principles on which the Universal Exposition at St. Louis in 1904 is to be conducted.

Steam Pipe Coverings.

Engineering Magazine says that the loss of heat by radiation from pipes through which steam is flowing on its way from the boilers to the engine or other point of useful application has long been considered by the engineer as a matter requiring consideration, and in nearly every modern steam plant some form of pipe covering is employed to diminish this loss.

A great variety of materials has been proposed for use in this connection, and pipe coverings form a regular article of commerce in most places where steam is used.

The relative value of the different materials which have been used for pipe coverings has been a fruitful subject for discussion, but since the investigations at Ordway, a number of years ago, there has been no scientific investigation of the matter until the recent experiments of Mr. George H. Barrus, the data and results of which were presented by him before the recent meeting of the American Society of Mechanical Engineers.

The method employed in the tests was that of measuring the condensation of steam occurring in the pipes protected by the various coverings, in comparison with the condensation produced under similar and simultaneous conditions in uncovered pipes.

"The condensation test furnishes a method which is entirely satisfactory, not only in its practical aspects, but in its scientific bearings. The heat radiated from a steam pipe causes a portion of the inclosed steam to be condensed, and the quality of heat radiated is exactly proportional to the weight of steam condensed, this being a well established scientific fact. It is a matter of extreme simplicity to ascertain the quantity of steam which is condensed, for it is merely a question of weighing the resulting water on ordinary weighing scales. The quantity of radiated heat which the condensation represents is determined with equal facility by reference to the well-established tables of the properties of steam. It seems quite unnecessary, therefore, to consider any other method of testing radiation from steam pipes, when the condensation method is so readily and accurately used, and when its results are determined with such reliability as to leave nothing further to be desired. A matter, of the first importance, moreover, is that this method determines the exact thing for which non-conducting material is applied to steam pipes, which is, the quantity of condensation prevented, and the saving of fuel which covering the pipes secures.

"Condensation tests require, first, that the steam supplied to the pipes, which are subject to test, shall be at the outset free from condensation; in other words, dry steam. They require, second, that all the water condensed shall flow by the force of gravity to some low point from which it can be readily and completely drawn off for measurement. They require, third, that the surfaces of the pipe within shall be continuously supplied with steam, and that no air held in suspension by the steam shall collect at any point and prevent its contact with the surface. They require, fourth, that the water of condensation drawn off from the apparatus, which under the effect of the pressure of the steam in the pipe is at a temperature much above 212°, shall be cooled on its escape to the weighing receptacle, so as to prevent loss of water by evaporation.

The apparatus used on these tests was so arranged as to accomplish all the objects noted."

Previous tests which have been made for the measurement of the efficiency of pipe coverings have been upon a rather small scale and for short periods of time, but these tests included surfaces from 60 to 100 square feet in area, and extended over a month of time, during 8 or 9 hours each day, so that the results may fairly be considered as representative of actual working conditions.

In the first place the condensation occurring in the bare pipes furnishes some interesting information in a general way, showing, as it does, the rate of transmission of heat which may be expected in pipes of 2 and 10 inches in diameter, exposed to the air. With a difference of about 300° F. between the temperature of the steam and external air, the mean of the tests showed a transmission of about 3.2 B.T.U. per square foot per hour per degree F. This determination alone is a valuable addition to the constants of steam engineering, especially as it has been obtained under conditions closely similar to those obtaining in the heating of air by steam pipes, and it will doubtless prove very useful in future computations for steam heating appliances.

The pipe coverings tested included those in extensive use in modern engineering practice, including asbestos, magnesia, different kinds of air cell coverings, as well as asbestos hair felt, and the results are given both in the form of tables and as graphical diagrams. The most interesting thing about this portion of the paper is the slight difference which appears in the value of the different coverings, all of them indicating the great value of some form of covering, and showing the small choice existing between those tested.

Mr. Barrus calls attention to the fact that it has long been known that the most efficient covering, as regards merely the non-conducting properties, is hair felt, and the tests showed that those coverings which approached the most closely to hair felt in physical characteristics gave the best results. The reason for the superiority of hair felt is the fact that this covering divides up and entraps the air which it contains in a better manner than any other material commonly used, and it is the non-conducting properties of confined air upon which the efficiency of the covering depends. The only reason for using other materials, therefore, is to obtain a higher degree of durability, and this, in connection with the cost, becomes the controlling factor in the choice of a covering.

Compared with the bare pipes, it appears that the efficiency of the various coverings tested was about 80 per cent., or in other words, the condensation of the steam in the covered pipes was only about one-fifth of that which took place in the bare pipes. Mr. Barrus gives some interesting computations as to the money value of the coverings, this manifestly being dependent to a certain extent upon the first cost of the covering and the life before renewal, but in all cases the gain due to the saving of steam is greatly in excess of the expenditure, and the showing is such as to convince anyone of the great economy in providing the best possible covering for all exposed steam pipes.

Iowa Cities Can Regulate Lighting Rates.

Municipal Engineering reports that a decision was handed down by Judge P. B. Wolfe of the District Court, June 3, in the case of the Davenport Gas and Electric Company vs. the City of Davenport, Ia., in which the Company asked for a writ of mandamus to compel the defendants to select arbitrators, or to select 3 cities, or to itself fix the rate or price of lights so that under some one of the three ways the price the defendant is to pay to the plaintiff for lighting its streets and public places can be fixed. Judge Wolfe, whose decision was favorable to the Company, said that the main contention in the case arises on law questions, to be determined on a construction of the ordinance, which is at once a franchise and a contract; that only two questions of fact are to be formed and determined by the court under the evidence, viz.:

1. The condition of the plant, gas mains and electric wires.

2. Is the alternating inclosed arc lamp a better light than the direct open arc lamp?

The city claimed, in its answer and cross bill, that the gas and electric light as furnished to the inhabitants was of a poor kind and quality. The court says that not a syllable of evidence was introduced or even offered to sustain said allegation, so that it will have to be taken by the court, no evidence having been offered to the contrary, that both the gas and electric light, as they have been furnished to the inhabitants of Davenport, was satisfactory to them. Regarding the conditions of the plant, no evidence was offered to sustain the charges that the plant was not in good condition.

Judge Wolfe says:

While the evidence establishes that the alternating current inclosed arc lamp is a cheaper light than the one now in use by the city, yet the evidence to my mind is convincing that it is a very inferior light to that given by the direct open arc lamp, and when used according to the testimony does not seem to give satisfaction to the inhabitants; as the ordinance calls upon the plaintiff to "give the city and the citizens thereof the advantages of all improvements in the production of gas and electricity," in my judgment a cheaper but a poorer light is not an improvement. I find that under the evidence the plaintiff cannot be required to change from the open direct arc lamp to the inclosed alternating current arc lamp.

Is the contract and franchise *ultra vires?*

In my judgment so much of the contract as undertakes to deprive the city council of the power to fix the rates and seeks to confer that power either upon arbitration or to fix it by the average rates paid by any six cities is *ultra vires* and absolutely void as, under Section 725, that power is in the council, and it is their duty and right to fix such rates and prices for the lighting of the city as will be just and reasonable between the plaintiff and the city, and I may in this connection quote from what our Supreme Court says, in Des Moines vs. Water Works, 95 Iowa, 360: "Although the law provides that the council of certain cities shall have the power to fix the charges for furnishing water, gas, electric light, steam heating, and provides that the act shall not be construed to authorize the passage of an ordinance or resolution or the making of any contract whereby the above powers are abridged" must be held to authorize the fixing of reasonable rates. To give such a statute an absolute effect would be as plainly unconstitutional as the statute of Minnesota, declared to be void by the United States Supreme Court, "the principle is well settled that the rates established must be reasonable."

If for any reason the parties cannot agree upon what are reasonable rates, under the holding in the Des Moines water works case, supra, the court will have to establish what are reasonable rates; but to again quote from said case, page 367: "It is apparent such an agreement should be made, in view of the many difficulties attending the establishment of exactly reasonable rates by judicial proceedings."

In relation to the allegation that the contract is beyond the power conferred upon the city by the statute, and void because it grants the use of the streets, alleys, etc., to the plaintiff and agrees to pay rentals exclusively to plaintiff for the period of 25 years, he says:

The proposition on which this contention rests is that the members of the city council are trustees for the public, that they exercise legislative power, and that they can make no grant and conclude no contract that will bind the city beyond the terms of their office, because such action would circumscribe the legislative powers of their successors and deprive them of the right to their unrestricted exercise as the exigency of the times might demand. Such reasoning ignores the settled distinction between the govermental or public and the proprietary or business powers of a municipality and erroneously seeks to apply to the latter a rule which is only applicable to the existence of the former. A city has two classes of power, the one legislative, public governmental, in the exercise of which it is a sovereignty and governs its people; the other proprietary, quasi private, conferred upon it, not for the purpose of governing the people, but for the private advantage of the inhabitants of the city and of the city itself as a legal personality. In the exercise of the powers of the former class, it is governed by the rule here invoked by the city attorney. In their exercise it is ruling its people and is bound to transmit its powers of government to its successive sets of officers, unimpaired. In the exercise of the powers of the latter class, it is controlled by no such rules because it is acting and contracting for the private benefit of itself and its inhabitants, and it may exercise the business powers conferred upon it in the same way, and in their exercise it is governed by the same rules that govern a private individual or corporation.

Judge Wolfe orders the writ of mandamus to issue, and gives the council 30 days in which to fix the rates, at the end of which time if they have fixed the rate of price, the bill of the plaintiff will be discussed. If they do not act in said time, a writ of mandamus will issue, commanding them to fix the rate.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

"F. C.," WRITING to the JOURNAL from New Orleans, La., under date of June 28th, says: "To the Editors AMERICAN GAS LIGHT JOURNAL: Please to correct an error in the paper, read by Mr. Bankson Taylor at the meeting of the Western Gas Association, in New Orleans, La., last May. In the paper, as printed in the JOURNAL for June 23d, Mr. Taylor remarks that the Superintendent of the old Company stated that the capacity of the works, in so far as water gas generation was concerned, was 750,000 cubic feet daily. It is on record that, with one 8-foot set, there was made 50,000 cubic feet per hour. With high heats the two sets were capable of making 2,000,000 cubic feet in 24 hours, without any changes or improvements. We found that 20 or 22 inches pressure

on blast at inlet to generator, and using a good fuel coke or hard coal, was all that was needed to make the quantity named."

THE D. M. Steward Manufacturing Company, of Chattanooga, Tenn., through its Vice-President, Mr. Robt. Bruce Steward, advises us that the branch office, located last March in Chicago, Ills., as a trial affair, has been made permanent. Perhaps in concluding the mention it would be best to use Mr. Steward's own words thereon. He says: "The results have been highly gratifying. * * * A full stock of all standard styles and sizes of Steward alava tips and burners will be carried in stock at the Chicago office, and prompt shipment will be made of all orders received. We have very pleasant quarters there, in the Western Methodist Book Concern Building, which is a modern, up-to-date fire-proof structure, located in the center of Chicago's activity."

MR. CHARLES R. FABEN, JR., is our authority for the statement that the proprietors of the Toledo (O.) Gas Light and Coke Company have no intention of joining forces with those of the Northwestern Ohio Natural Gas Company.

THE Talladega (Ala.) Light and Water Commissioners have decided to make "important improvements" on the gas plant which they operate on public account. To gas men who "know those works" it would seem that the only way to improve them would be to tear them down, and then invite tenders for something new.

JUDGING from the reports in the newspapers, one might be held excusable for thinking or believing that the plant of the Newton and Flushing (L. I.) Gas Company was all but destroyed by fire the morning of the 24th ult. It is true there was a fire in the named works on the date noted. It happened in the generator room, and the damage occasioned did not exceed $100 in amount.

MR. WILLIAM F. BUCKLEY, of San Francisco, Cal., writes: "Our Gas Workers' Union here is in flourishing condition, and we are receiving accessions to our ranks every day. The officers of the Union are: President, William F. Buckley; Vice President, Bernard Curtis; Recording Secretary, C. M. Hill; Financial Secretary, H. S. Cleveland; Treasurer, L. J. Hoffman; Guardian, Peter V. Kearns; Guide, J. P. Haley."

THE Messrs. Holmes, of Huddersfield, England, who are the English agents for the Western Gas Construction Company's apparatus, have contracted with the Londonderry (Ireland) Gas Company, for 2 sets of the Western Construction Company's generating machines. The capacity of each set is rated at 250,000 cubic feet per day.

LAST week we reported that the proprietors of the Madison (Wis.) Gas Company had awarded a contract to the United Gas Improvement Company for the construction of duplicate water gas sets of its well-known type. In reality the concern that was authorized to put up the apparatus at Madison was the Western Gas Construction Company.

MR. A. B. SAGE, formerly Manager of the Athens (Ga.) Gas Company has been appointed Manager and Superintendent of the Meridian (Miss.) Gas Company, vice Mr. W. H. Frapwell, resigned.

THE Semet-Solvay Company has ordered from the Western Gas Construction Company a water gas apparatus of the latter's improved design up to a capacity of 750,000 cubic feet per day. This apparatus is to be employed for the enrichment of the coke oven gas which is to be supplied under contract to the Detroit City (Mich.) Gas Company.

THE Huntsville (Ala.) Gas Light Company's properties and franchise have at last been sold under the decree issued some months ago by the Chancery Court. The sale was made the 26th of last month by Receiver Hundley, and the nominal purchaser was Mr. R. C. Brickell. The price paid was $43,000. The plant will be virtually rebuilt, if the present plans of the Brickell syndicate are carried out.

MR. ROBERT JOHNSTON, formerly connected with the general offices of the Erie Railroad in this city, has been appointed cashier of the Springfield (Mass.) Gas Light Company, vice Mr. J. W. Nourbourne, resigned.

MR. ALBERT GALLATIN, General Manager of the Sacramento (Cal.) Gas and Electric Company, declares that the San Francisco syndicate has not purchased the properties of the named Company, but admits that the sale is merely a matter of time.

THE Central Lighting Company, to transact a general business in the manufacture and distribution of gas and electricity, for lighting heating and power uses, has been organized in Portland, Me. Its officers are: President, Geo. F. Duncan; Treasurer, Edward Woodman.

AT a special meeting of the Board of Commissioners of the Port of New Orleans, La., the New Orleans Lighting Company was authorized to hook up the town of Algiers to its main system in New Orleans.

THE transfer of the properties of the Media (Pa.) Gas Company to the Suburban Gas Company, of Philadelphia, has been formally completed.

PAXTON, ILLS., believes that a gas company would be an advantage to it, and the Chicago Building and Manufacturing Company, through Mr. J. W. Tilford, is negotiating for the necessary franchise.

THE Holyoke (Mass.) Water Power Company has made a concession to its gas works employees, respecting the demands of the latter for an increase in wages. The concession amounts to an advance of 25 cents per day.

A CORRESPONDENT forwards the following from Alameda, Cal., under date of June 24th: "The shortcomings of the city's electric plant bob up at the most unexpected times. Something is being done every once and a while that is just going to fix things all right, and just when they are all fixed something else happens. Now the trouble is that the business men of the city are withdrawing their patronage from the city plant and are lighting their stores with gas. This announcement was made last evening, at the meeting of the Board of City Trustees, by Mr. Mackie, and it was admitted to be the fact by both President Forderer and Trustee Combs. Electric light matters were taken up when the communication of Joseph Bernard objecting to the size of a bill that had been presented to him for electricity was taken from the City Clerk's file. It had been passed along from meeting to meeting without any definite action being taken on it and President Forderer ordered that it be passed along some more. Clerk Gillogly advised the members of the Board that City Attorney Simpson had spoken to him about it and had requested that action be taken at once so that he could go ahead and sue Mr. Bernard. 'I cannot understand why Mr. Simpson is so anxious to sue a reputable citizen on a bill that is disputed before the Trustees have been able to get at the bottom of the trouble,' said Trustee Mackie, somewhat emphatically. 'I made a visit to Mr. Bernard's place and found that he was only using city light in four small rooms, and I could not see how it were possible for him to use as much electricity as he is charged for. This matter should be allowed to rest until we are given an opportunity to ascertain the cause of the trouble. Now while we are talking about electric light matters, I have noticed that the Park street business men have deserted the city plant and are lighting their places with gas. This shows that there is either something wrong with the management or with municipal ownership. Another thing that I have noticed is that the few lights that remain look like candles alongside of the mantle burners that the merchants are using with gas. I thought when Mr. Thompson was appointed to a position in the electric light department part of his duty was to rustle up business, but I see that for some reason or other he remains in his office all of the time. I would suggest now that if his duties do not extend to that part of the business that they be enlarged so that he can get out and interview the merchants and solicit their patronage.' President Forderer did not seem inclined to believe that the fault was with Mr. Thompson. He said that the whole trouble was with the cost of the electricity to the consumer. 'We may find it necessary,' he said, 'to reduce the price from 12 cents to 10 cents per 1,000 watts.' Mr. Combs said that the real trouble on Park street was that the merchants had found that electricity was costing a great deal more than gas. 'It is my idea,' said Mr. Mackie, 'that one of the chief troubles is the meters. They register too rapidly and figure up too extravagantly. There is no reason that I can see why the city cannot sell light as cheaply as a private corporation.' The Trustees finally decided to hold a committee meeting and do more fixing with the electric plant."

AT the annual meeting of the Berkley (Cal.) Electric Light Company the officers chosen were: Directors, John A. Britton, A. T. Eastland, Jno. T. Wright and Jos. J. Mason; President, John A. Britton; Vice-President, Anson S. Blake; Secretary, Jos. J. Mason; Treasurer, First National Bank.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
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NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.
PACIFIC COAST GAS ASSOCIATION

Notification Respecting Advertising.—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co. 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JULY 7, 1902.

The Market for Gas Securities.

Renewed rumors respecting the near approach of the amalgamating of the interests of the Consolidated and Brooklyn Union Companies are evidently responsible for the sharp advances made in the shares of both the named concerns. Consolidated closed last week at 220 to 220½, and the closing quotation for it this week was 224 to 224½. Brooklyn Union, on very scant trading, sold up to 240, and the nominal price for it to-day (Thursday) is 235 to 240. Mutual is 335 bid, and the nominal asking price is 350. Standard common is in some demand.

In out-of-town shares, Peoples, of Chicago, is steady, and the same may be said of Baltimore Consolidated. Those conversant with the situation in Baltimore declare that the regular ticket at the annual election will win easily. Syracuse (N. Y.) gas securities have advanced materially, and par is predicted as near at hand for the preferred.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JULY 7.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	224	224½
Central Union, Bonds, 5's.	3,000,000	1,000	108	111
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	350	..
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	111½	..
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River.. Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	100,000	1,000	103	
Standard	5,000,000	100	130	135
Preferred	5,000,000	100	150	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	235	240
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	1¾	2
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	12½	13
" " Bonds, 5's	5,250,000	1,000	83½	84½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000		
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	103¼	103½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	108	109
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89½
Preferred	3,026,500	100	106¼	107¾
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	70	70¼
Mortgage, 6's	3,600,000	..	..	115
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	.	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	85	87
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,825,500	50	.	80
" Prior Lien 5's.	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	382,000	1,000	77	79
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	.	.
" Bonds	2,000,000	..	58	63
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	72	78
" Bonds, 6's	2 650,000	..	102	104
Jackson Gas Co.	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	85	89
Preferred	2,500,000	100	103	109
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	58	64
Louisville	2,570,000	50	112	120
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	25	87
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Nashville Gas Lt. Co.	1,000,000	100	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	101½	101¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	48	48½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's.	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's.	2,465,000	1,000	92	94
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	95	96½
Syracuse, N. Y.	1,750,000	100	24	27
Bonds	1,612,000	1,000	84	84½
Washington, D. C	2,600,000	20	360	365
First mortgage 6's	600,000	..	..	..
Western, Milwaukee. Bonds, 5's	4,000,000	..	109½	110
Wilmington, Del.	600,000	50	232	..

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., N. W. CORNER BROAD AND ARCH STS., PHILADELPHIA, PA., June 11, 1902.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable July 15th, 1902, to stockholders of record at the close of business, June 30, 1902. Checks will be mailed.

1410-5 LEWIS LILLIE, Treasurer.

SEALED BIDS,

BOARD OF PUBLIC WORKS, KANSAS CITY, MO., June 27, 1902.

Will be received at the office of the Purchasing Agent of the Board of Public Works, on or before noon, Saturday, July 12, 1902, for 1,000 gasoline vapor lamps, erected ready for lighting. Specifications can be had upon application to the Purchasing Agent of the Board of Public Works.

A certified check, to the amount of $3,000, must accompany each bid.

The Board reserves the right to waive any informality in any bid, or to reject all bids.

WILLIAM WESTON,
1413-1 Purchasing Agent Board of Public Works.

SEALED BIDS,

BOARD OF PUBLIC WORKS, KANSAS CITY, MO., June 27, 1902.

Will be received at the office of the Purchasing Agent of the Board of Public Works, on or before 2:30 P.M., Thursday, July 10, 1902, on 2,000 by pass burners, with inside pilot, equipped with mantle and cylinder glass chimneys for street lighting purposes.

A certified check, in the amount of 5 per cent. of the bid, must accompany all bids.

The Board reserves the right to waive any informality in any bid, or to reject any or all bids.

WILLIAM WESTON,
1413-1 PURCHASING AGENT BOARD OF PUBLIC WORKS.

WANTED.

AN UP-TO-DATE MANAGER, of many years' experience in the gas business, desires to secure a connection with some good gas company, in a position of trust and responsibility, as soon as possible. Address,
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WANTED,

An Additional London Representation, in Touch with Shippers and all Gas Companies.

Moderate terms; highest references.

Address, E PADFIELD & CO.,
West India House, 96 and 98 Leadenhall St.,
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FOR SALE.

1,800 Gasoline Burners and Tanks, complete, for Street Lights.

Used very little. Good as new. Address,
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1409-5 Providence, R. I.

FOR SALE.

Apparatus for Complete Water Gas Plant,

Consisting of 5-ft. cupolas; purifying boxes, w th center seal; engine, boiler, blower and holder.

Address, "P. R. R.,"
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GAS ENGINES FOR SALE.

Having made a change in our plant, we offer for sale

THREE OTTO GAS ENGINES,

of 50-horse power each; a'so, one starter. All in good condition. For terms, apply to

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WE PURCHASE:

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Globe Street and Boulevard Lamps.
Cheapest and Best.
THOUSANDS IN USE WITH INCANDESCENT BURNERS.
Send for Catalogues.
THOMAS T. W. MINER,
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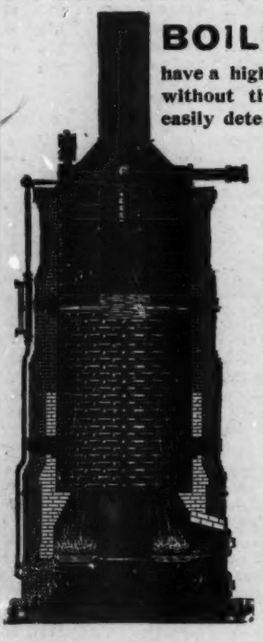
HAZELTON WATER TUBE BOILERS



have a high factor of safety without the use of thick, easily deteriorated plates.

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GAS BURNERS,

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Drip Pumps, Service Cleaners, Gasfitters' Proving Pumps and Mercury Gauges.

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Consumes Less Gas.
A Handsome Fixture.
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The engraving shows the arrangement of tracks in a boiler house. We furnish cast plate railway track in sections 5 feet long and 28 inches wide. For the remaining space, cast iron floor plates, 13 inches square, make an excellent and durable floor, pleasing to the eye, cleanly, with a good foothold for the firemen, and an almost total absence of wear or repairs. It is without any exception whatever the best and most durable boiler or engine floor in use.

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Economize Heat in Water Gas Plants,

BY UTILIZING A

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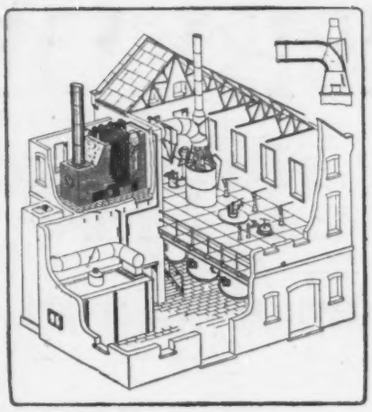

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Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

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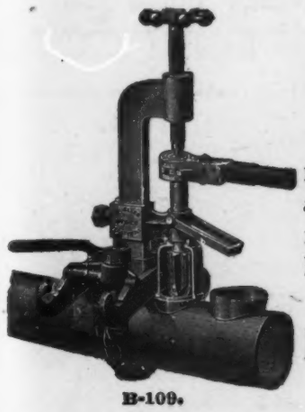
SOLE AGENTS FOR THE UNITED STATES.



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By the use of this attachment to our regular pattern machine your service men are exempt from danger of asphyxia, can make more taps a day, and need less help.

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The Best Light in the World

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Stores, Churches, Halls or any large indoor areas.

Guaranteed to give a greater volume of light, better diffused and steadier than an electric arc.

A Complete Revolution in Gas Lighting.

A sample lamp sent on 30 days' trial to any Gas Company.

This lamp is thoroughly protected with both Mechanical and Design Patents. Imitation of this Design and Construction will be prosecuted.

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FRED. BREDEL, C.E.

Coal and Water Gas Plants.

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RECUPERATIVE FURNACES, WASHERS, CONDENSERS, PURIFIERS, PURIFYING MACHINES, COKE CONVEYERS, ETC.

SOLE UNITED STATES AGENT FOR

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Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas.

GAS RETORTS AND SPECIAL BLOCKS AND FIREBRICK MANUFACTURED UNDER THE SUPERINTENDENCE OF MY OWN CHEMIST.

COMPLETE GAS WORKS

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Lloyd Construction Company,

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MANUFACTURERS AND CONSTRUCTORS OF GAS APPARATUS AND PLANTS.

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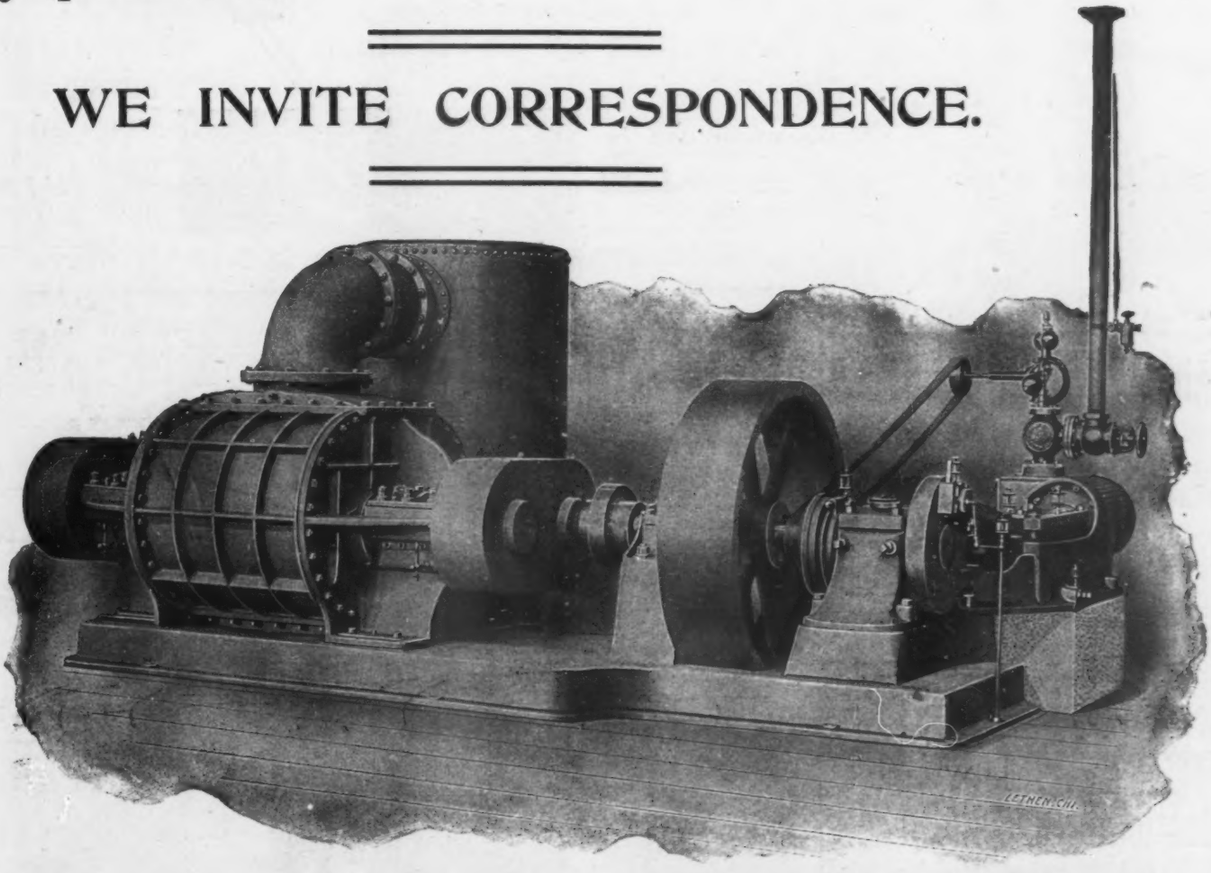

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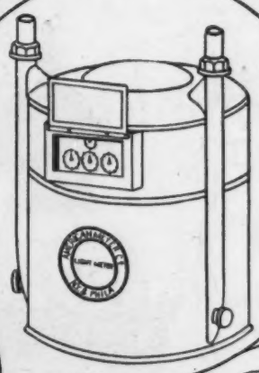

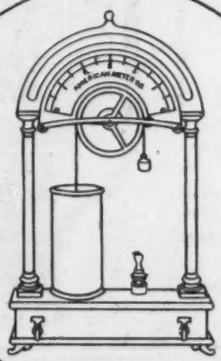

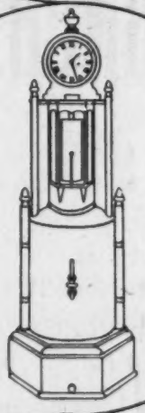

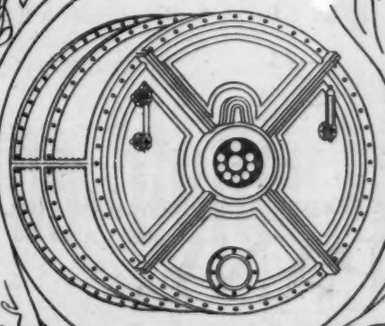

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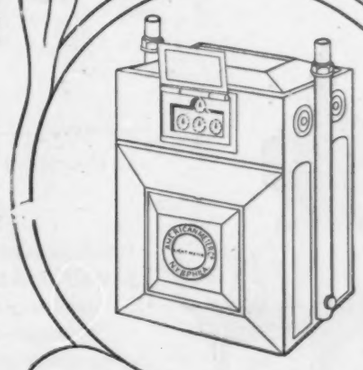
PUBLIC LIGHTING TABLE.

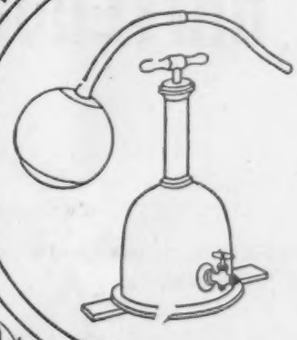
JULY, 1902.

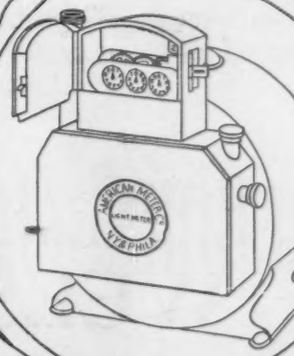
Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Tue.	1	8.00 PM	2.50 AM	7.30	3.15
Wed.	2	8.00	3.40	7.30	3.15
Thu.	3	8.00	3.40	7.30	3.15
Fri.	4	8.00	3.40	7.30	3.15
Sat.	5	8.00 NM	3.40	7.30	3.15
Sun.	6	8.00	3.40	7.30	3.15
Mon.	7	8.00	3.40	7.30	3.15
Tue.	8	8.00	3.40	7.30	3.15
Wed.	9	8 00	3.40	7.30	3.15
Thu.	10	9.40	3.40	7.30	3.15
Fri.	11	10.10	3.40	7.30	3.15
Sat.	12	10.40 FQ	3.40	7.30	3.15
Sun.	13	11.20	3.40	7.30	3.15
Mon.	14	11.50	3.40	7.30	3.15
Tue.	15	12.30 AM	3.40	7.30	3.15
Wed.	16	1.20	3.40	7.20	3.15
Thu.	17	2.00	3.40	7.20	3.15
Fri.	18	3.00	3.40	7.20	3 15
Sat.	19	No L.	No L.	7.20	3.15
Sun.	20	No L. FM	No L.	7.20	3.15
Mon.	21	No L.	No L.	7.20	3.15
Tue.	22	7.50 PM	9.20 PM	7.20	3.15
Wed.	23	7.50	9.50	7.20	3.15
Thu.	24	7.50	10.20	7.20	3.15
Fri.	25	7.50	10.50	7.20	3.15
Sat.	26	7.50	11.20	7.20	3.15
Sun.	27	7.50 LQ	12.00	7.20	3.15
Mon.	28	7.50	12.40 AM	7.20	3.15
Tue.	29	7.50	1.30	7.20	3.15
Wed.	30	7.50	2.30	7.10	3.30
Thu.	31	7.50	4.00	7.10	3.30

TOTAL HOURS LIGHTING DURING 1902.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	238.30	January	423.20
February	196.20	February	355.25
March	196.20	March	355.35
April	166.40	April	298.50
May	151.40	May	264.50
June	131.10	June	234.25
July	142.40	July	243.45
August	162.00	August	280.25
September	179.00	September	321.15
October	216.30	October	374.30
November	224.10	November	401.40
December	250.00	December	433.45
Total, yr.	2255.00	Total, yr.	3987.45







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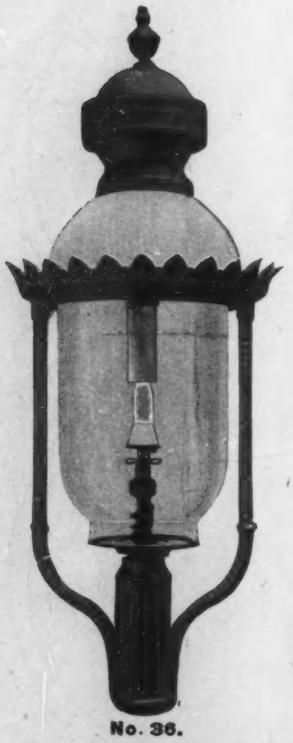

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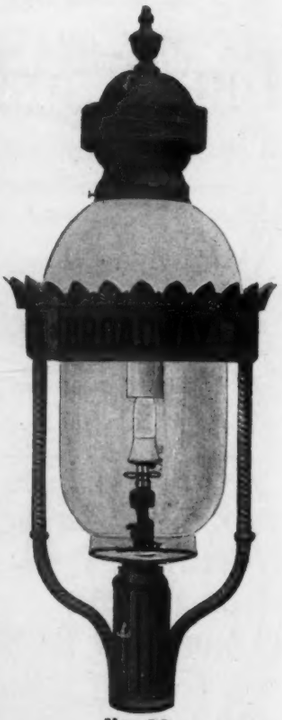

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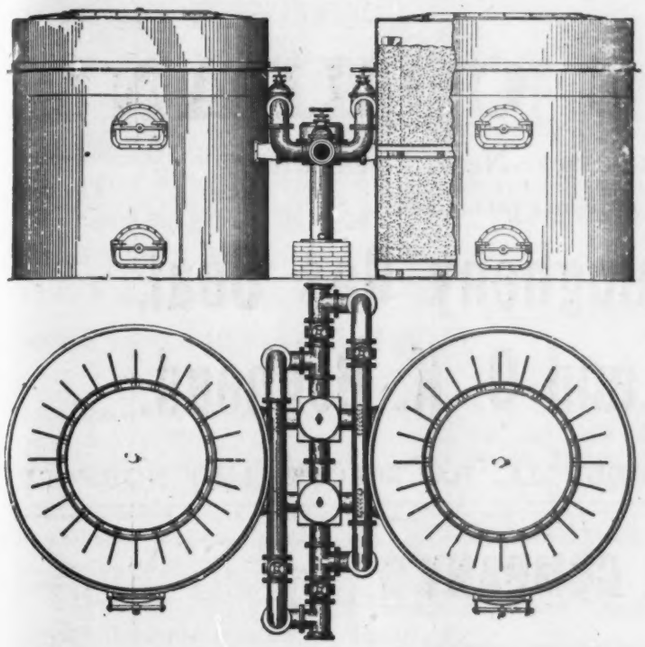

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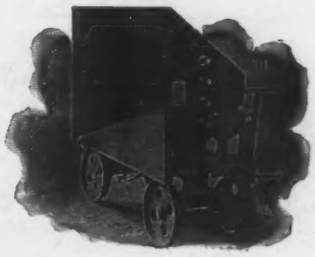

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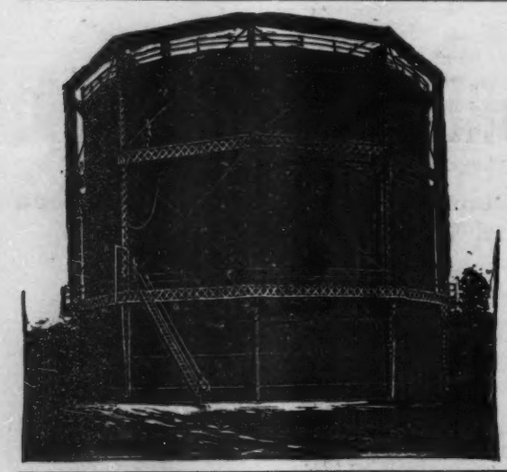

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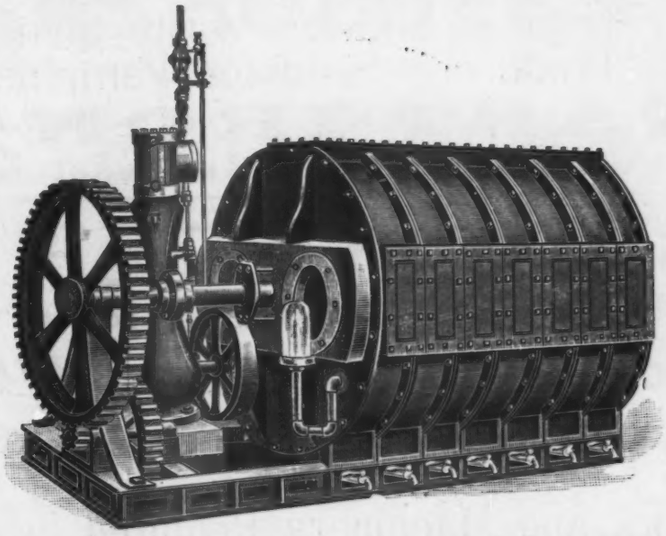

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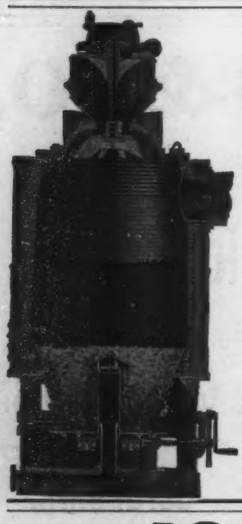

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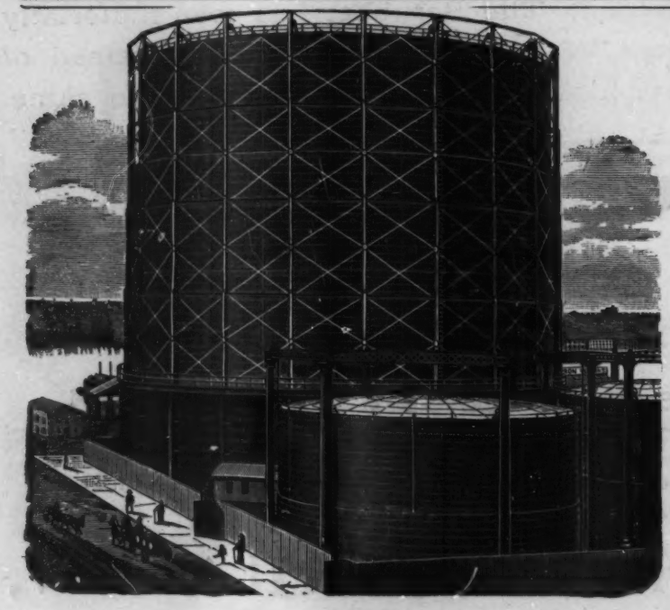

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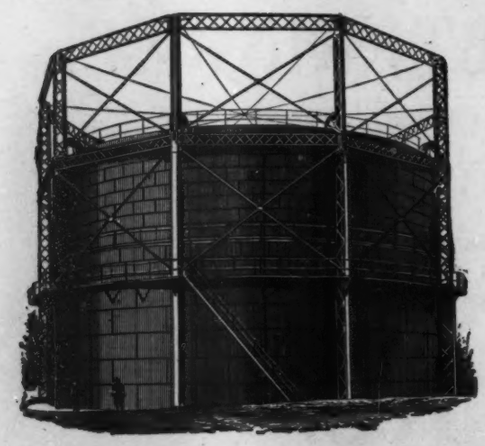

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